ORDER NO. FTD97050535

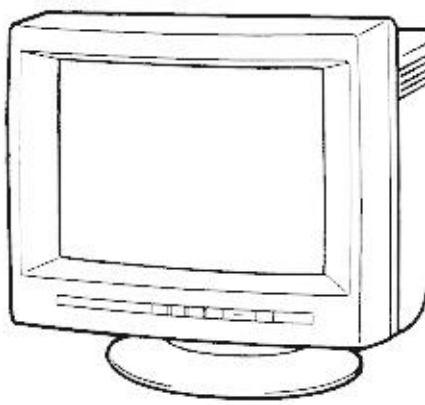
# Service Manual

## Multi-Scan Color CRT Display

## MODEL GT775 (TX-D7T53V-M/-E/-A)

**Chassis No. HV8AP**

**Chassis Family No.17HV8AP**



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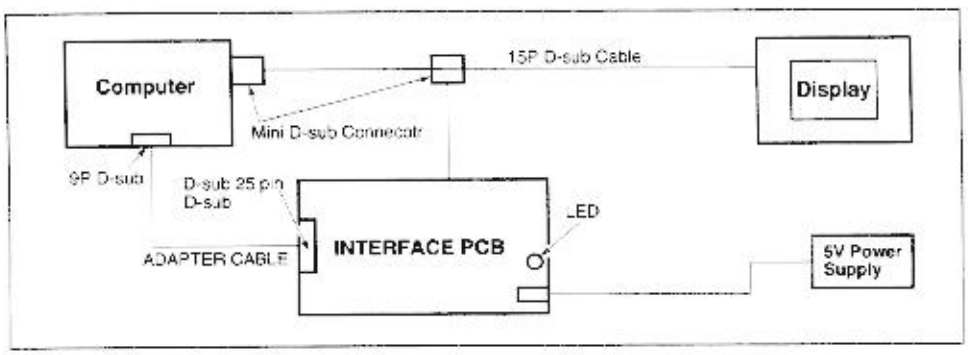
ViewSonic

# TECHNICAL INFORMATION FOR DDC

ust be noted that this monitors is designed to be applicable to DDC1 communication the following points are different
n ordinary monitors.
. Use the signal cable, the which is furnished as an accessory (applicable to DDC1) only.
. When replacing a PCB on which ROM for DDC1 is mounted, data writing is required.
In addition to the above, a computer applicable to WINDOWS and a 5V power supply unit are required.

C1 Data Read/write System
. Communication jig
(1) The composition of Communication jig
1 Interface PCB. 2 Adapter cable (D-SUB 25P → 9P) 3 15P D-SUB cable

(2) Connection diagram for communication jig

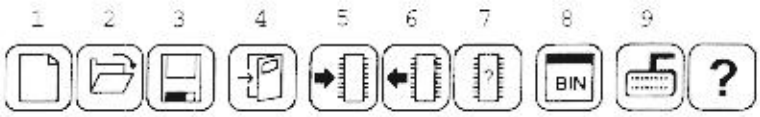



(3) Procedure to turn on the power:
1 Make connections as shown above.
2 Turn on the computer.
3 Turn on the power supply of communication jig.
4 Turn on the power supply of the MONITOR.
(Note) If the above-mentioned operation is normal, LED of the communication jig turns green after step (4).
If this LED is red, repeat the steps (3) and (4).

(4) Confirmation of DDC mode
LED is mounted on the communication jig. According to its color, the DDC mode can be discriminated.
- When LED is green. DDC1 mode.
- When LED is orange. DDC2B mode.
- When LED is red. Transmission error.
- When LED is not lit. Obsolete.

. Preliminary arrangements for using DDC data read/write software
(1) Copy DDC WRITE. EXE from floppy disk to hard disk drive (Name: \PanaTool Directory).
(2) Register DDC data read/write software (DDCWRITE.EXE) in the Icon.
1 Click the menu bar "Icon" of the program manager.
2 Select "register and group create" from the pull down menu.
3 Select "group create."
4 Name the group PanaTool and register the group.
5 Repeat (1) and (2) again and select "Icon registration."
6 Enter "DDC1/2B" for [Title] and "Hard disk drive name: \PanaTool\DDCWRITE. EXE" for [Command line]. Then select [OK].
. How to use DDC data read/write software.
(1) Start of DDC data read/write software.
Double-click the "DDC1/2B" Icon in the PanaTool group.
(2) Meaning of a button displayed.
The tool bar indicates the nine icons shown below.

These icons are explained, from left to right :



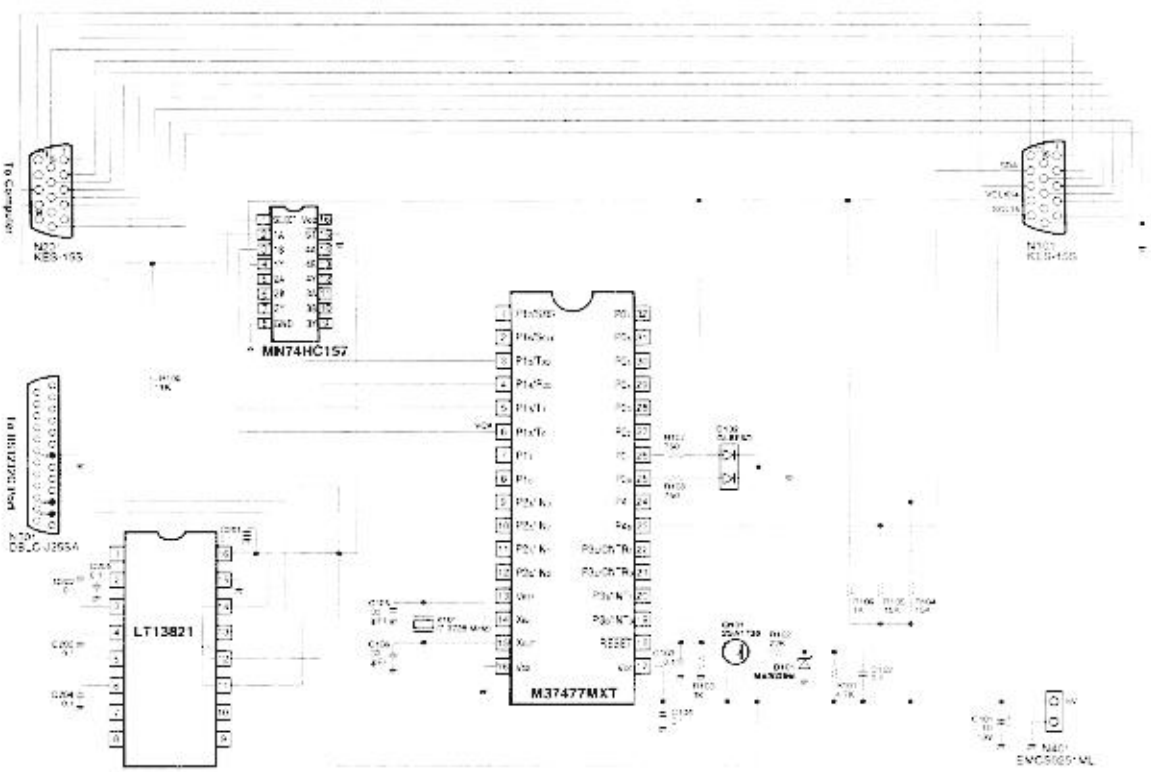

Icon 1 : Initialization of screen display contents.
Icon 2 : File is opened and displayed on the screen.
Icon 3 : Data are stored in a file.
Icon 4 : Finish the DDC data read/write software.
Icon 5 : Data displayed on the screen are written in EEPROM.
Icon 6 : Contents of EEPROM are displayed on the screen.
Icon 7 : Contents of EEPROM are compared with the data displayed on the screen.
Icon 8 : Check binary data by text format.
Icon 9 : Communication port setting
Contents of setting : PORT → Using Communication port No.
Baud rate → 9600, Data → 8 bits, Parity → Nil, Stop → 1 bits
Icon 10 : Version information display.

(3) Using the tool bar explained in (2) above, write data in EEPROM and make operations of reading, etc. A pop-up window may be displayed on the way. In such a case, select a proper one according to the message.

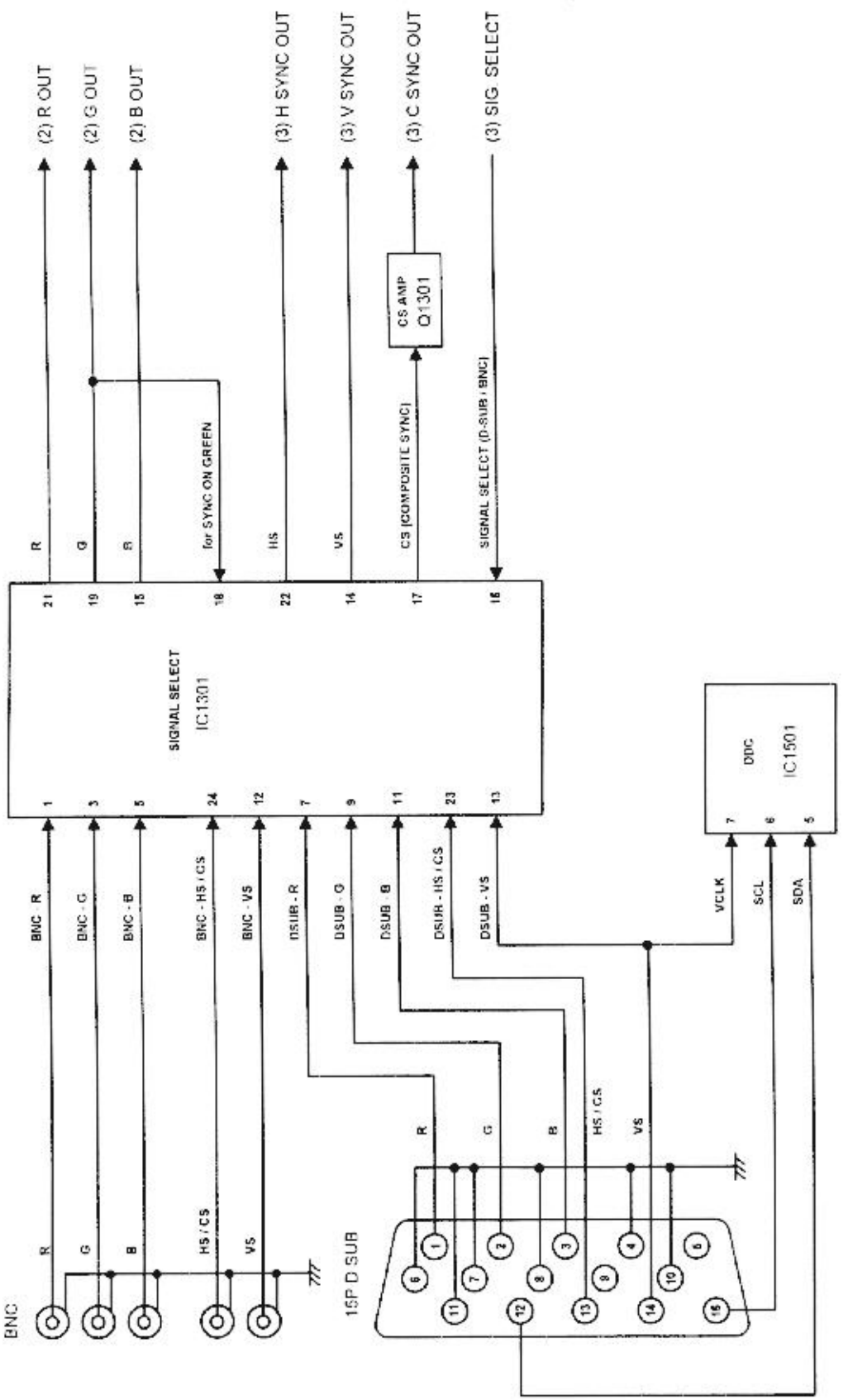
(Example 1) EEPROM data are displayed on the screen.
1. Click the icon (6th from the left) in the tool bar, with the arrow pointing from the memory chip.
2. Decided whether reading is started in DDC1 mode or DDC2B mode.
3. Select START.

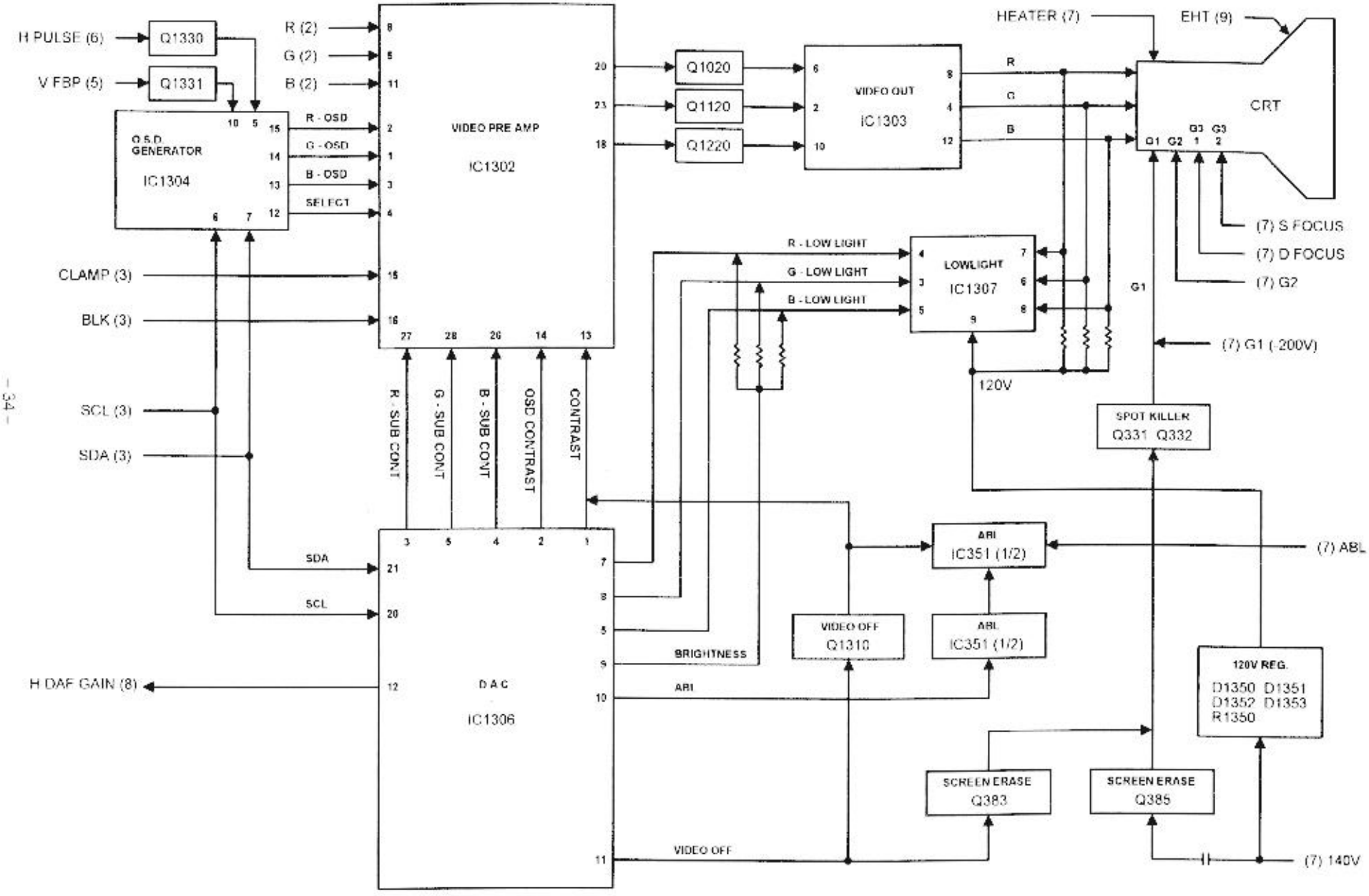
(Example 2) Data displayed on the screen are written in EEPROM.
1. Click the icon (5th from the left) in the tool bar, with the arrow pointing toward in the memory chip.
2. Select START.

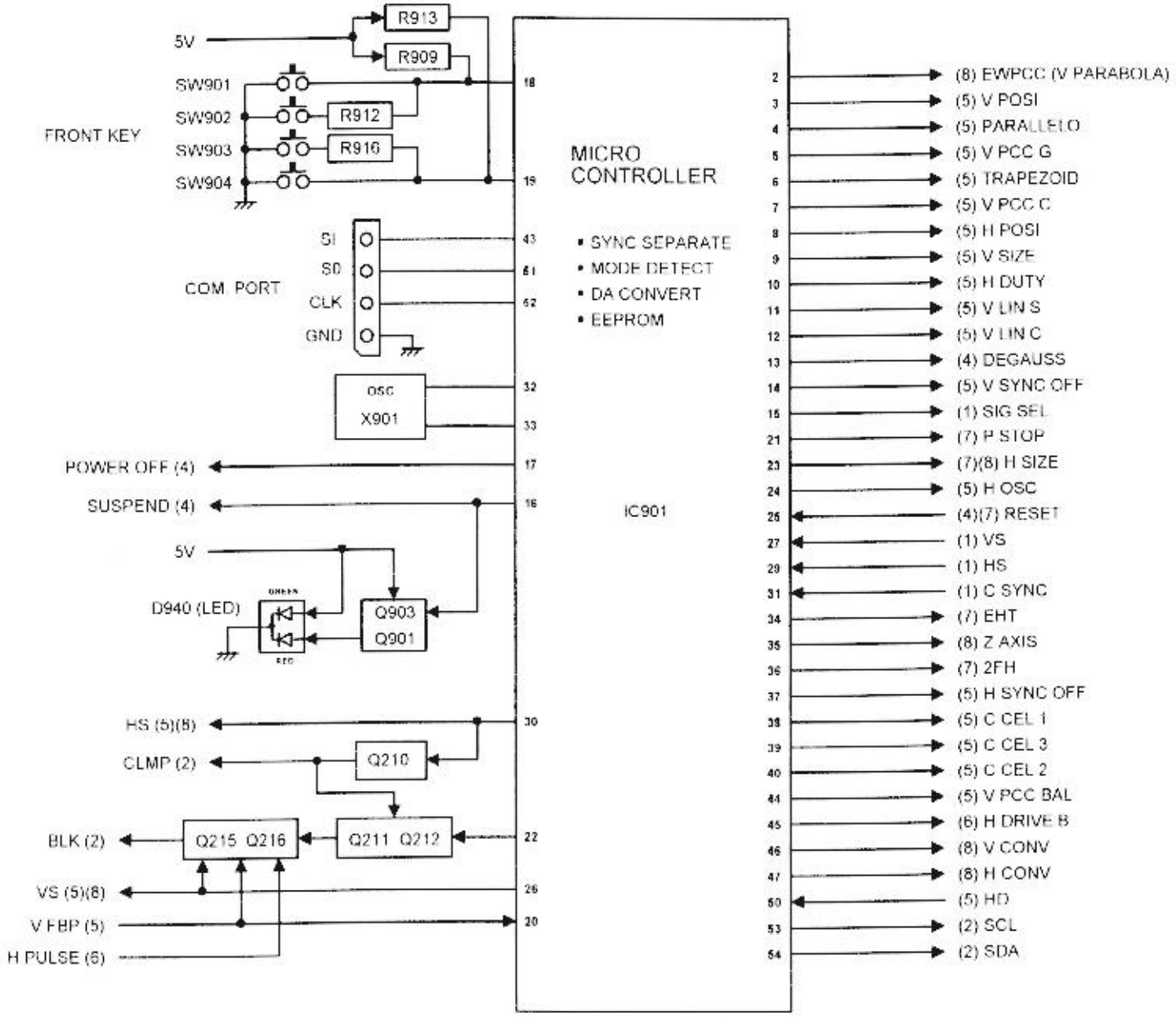
# SCHEMATIC DIAGRAM FOR INTERFACE



# BLOCK DIAGRAM




H PULSE (6)
Q1330
V FBP (5)
Q1331
O.S.D. GENERATOR
IC1304
R - OSD
G - OSD
B - OSD
SELECT
R (2)
G (2)
B (2)
VIDEO PRE AMP
IC1302
Q1020
Q1120
Q1220
VIDEO OUT
IC1303
HEATER (7)
EHT (9)
CRT
(7) S FOCUS
(7) D FOCUS
(7) G2
(7) G1 (-200V)
CLAMP (3)
BLK (3)
SCL (3)
SDA (3)
R - LOW LIGHT
G - LOW LIGHT
B - LOW LIGHT
LOWLIGHT
IC1307
120V
SPOT KILLER
Q331 Q332
R - SUB CONT
G - SUB CONT
B - SUB CONT
OSD CONTRAST
CONTRAST
ABL
IC351 (1/2)
(7) ABL
VIDEO OFF
Q1310
ABL
IC351 (1/2)
BRIGHTNESS
ABL
H DAF GAIN (8)
D A C
IC1306
120V REG.
D1350 D1351
D1352 D1353
R1350
SCREEN ERASE
Q383
SCREEN ERASE
Q385
VIDEO OFF
(7) 140V


5V
R913
R909
SW901
SW902
SW903
SW904
FRONT KEY
R912
R916
18
19
MICRO
CONTROLLER
• SYNC SEPARATE
• MODE DETECT
• DA CONVERT
• EEPROM
SI
SO
CLK
GND
COM PORT
43
61
62
OSC
X901
32
33
POWER OFF (4)
17
SUSPEND (4)
16
IC901
5V
D940 (LED)
Q903
Q901
HS (5)(8)
30
CLMP (2)
Q210
BLK (2)
Q215 Q216
Q211 Q212
22
VS (5)(8)
26
V FBP (5)
20
H PULSE (8)
2 (8) EWPCC (V PARABOLA)
3 (5) V POSI
4 (5) PARALLELO
5 (5) V PCC G
6 (5) TRAPEZOID
7 (5) V PCC C
8 (5) H POSI
9 (5) V SIZE
10 (5) H DUTY
11 (5) V LIN S
12 (5) V LIN C
13 (4) DEGAUSS
14 (5) V SYNC OFF
15 (1) SIG SEL
21 (7) P STOP
23 (7)(8) H SIZE
24 (5) H OSC
25 (4)(7) RESET
27 (1) VS
29 (1) HS
31 (1) C SYNC
34 (7) EHT
35 (8) Z AXIS
36 (7) 2FH
37 (5) H SYNC OFF
38 (5) C CEL 1
39 (5) C CEL 3
40 (5) C CEL 2
44 (5) V PCC BAL
45 (6) H DRIVE B
46 (8) V CONV
47 (8) H CONV
50 (5) HD
53 (2) SCL
54 (2) SDA

# SAFETY PRECAUTIONS

## 1 CAUTION:

No modification of any circuit should be attempted. Service work should only be performed after you are thoroughly familiar with all of the following safety checks and servicing guide lines.

## 2 SAFETY CHECK

Care should be taken while servicing this CRT display because of the high voltage used in the deflection circuits. These voltages are exposed in such areas as the associated flyback and yoke circuits.

## 3 FIRE & SHOCK HAZARD

3-1 Insert an isolation transformer between the CRT display and AC power line before servicing the chassis.

3-2 In servicing pay attention to original lead dress especially in the high voltage circuit. If a short circuit is found, replace all parts which have been overheated as a result of the short circuit.

3-3 All the protective devices must be reinstalled per original design.

3-4 Soldering must be inspected for possible cold solder joints, frayed leads, damaged insulation, solder splashes or sharp solder points. Be certain to remove all foreign materials.

## 4 LEAKAGE CURRENT COLD CHECK

4-1 Unplug the AC cord and connect a jumper between the two prongs on the plug.

4-2 Turn the CRT display power switch "on".

4-3 Measure the resistance value with an ohmmeter between the jumpered AC plug and each exposed metallic part on the CRT display such as the metal frame, screwheads, control shafts, etc. When the exposed metallic part has a return path to the chassis, the reading should be 1.8 megohm minimum.

## 5 LEAKAGE CURRENT HOT CHECK

5-1 Plug the AC cord directly into the AC outlet. Do not use an isolation transformer during this check.

5-2 Connect a 1500 ohm, 10 watt resistor, paralleled by a 0.15μF capacitor between each exposed metallic part and a good earth ground (as shown in Fig.1).

5-3 Use an AC voltmeter with 1000 ohm/volt or more sensitivity and measure the AC voltage across the combination 1500 ohm resistor and 0.15μF capacitor.

5-4 Move the resistor connection to each exposed metallic part and measure the voltage.

5-5 Reverse the polarity of the AC plug in the AC outlet and repeat the above measurement.

5-6 Voltage measured must not exceed 7.5 volt RMS. from any exposed metallic part to ground. A leakage current tester may be used in the above hot check, in which case any current measured must not exceed 5.0 milliamp. In the case of a measurement exceeding the 5.0 milliamp value, a rework is required to eliminate the chance of a shock hazard.

*Note: High voltage is present when this CRT display is operating. Always discharge the anode of the picture tube to the display chassis to prevent shock hazard.*

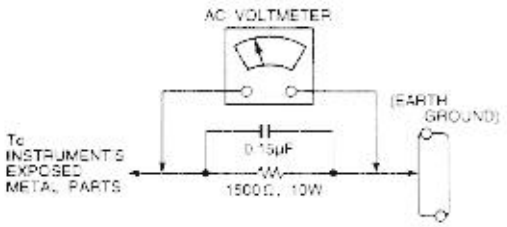



**Fig.1**

## 6 IMPLOSION PROTECTION

Picture tubes are equipped with an integral implosion protection system, but care should be taken to avoid damage and scratching during installation. Use only Panasonic replacement picture tubes.

## 7 X-RADIATION

WARNING : The only potential source of X-Radiation is the picture tube. However when the high voltage circuitry is operating properly there is no possibility of X-Radiation problem. The basic precaution which must be exercised is to keep the high voltage at the following factory-recommended level.

*Note: It is important to use an accurate periodically calibrated high voltage meter.*

7-1 The procedure for adjustment high voltage is as shown on page 25.

7-2 If can not be adjust 25.0 kV at immediate service is required to prevent the possibility of premature component failure.

7-3 To prevent X-Radiation possibility it is essential to use the specified picture tube.

**IMPORTANT SAFETY NOTICE**

There are special components used in this CRT displays which are important for safety. These parts are identified by the international symbol ⚠ on the schematic diagram and on the replacement parts list. It is essential that these critical parts should be replaced with manufacture's specified parts to prevent X-RADIATION, shock, fire or other hazards. Do not modify the original design or this will void the original parts and labor guarantee.

# GENERAL INFORMATION

## . OUTLINE

his monitor is a 17 inch multi-scan color CRT display ith the following features.

•OSD (on screen display) Control is newly introduced, Which allows eazy user adjustment. Power saving function, which helps saving energy, s also one of the highlights of this model.

## . FEATURES

-1 Power Saving

- Built in Power Saving function based on VESA-DPMS standard. Power energy shall be saved by controlling the circuit in accordance with power save signal from computer.

-2 OSD (on screen display) function

- OSD (5 languages) s a man-machine interface. Any one is able to set up the picture as he like through OSD menu.

-3 Self Test function [1]

- Self Testing picture comes out by pushing Any-key in the case of no-connection with computer or power saving operation. This function shows if monitor is alive or not and can be used for self aging test.

-4 Ergonomic design

- Low emission design to meet MPR II & TOC'92
- ESF (Electro static fie d) free coating on CRT

-5 Multi scan with digital technology

- 8 bit micro computer controls the circuit operation to meet with wide range signa of $f_H$=30~86kHz and $f_v$=50~160 Hz. So VGA640x350, VGA640x400, VGA640x480, SVGA800x600, 1024x768 and 1280x1024 mode are applicable.

2-6 1 Factory preset, (+7 Reservation), 13 user memories.

- 1 standard modes are preset at the factory.
- 7 modes are reserved at the factory.
- 13 user memories are available to set the users own timing and display information.

2-7 Cylindrical screen and fine stripe pitch

- Cylindrical screen with fine AG pitch 0.25mm gives a comfortable sight of the screen.

2-8 Superior display performance

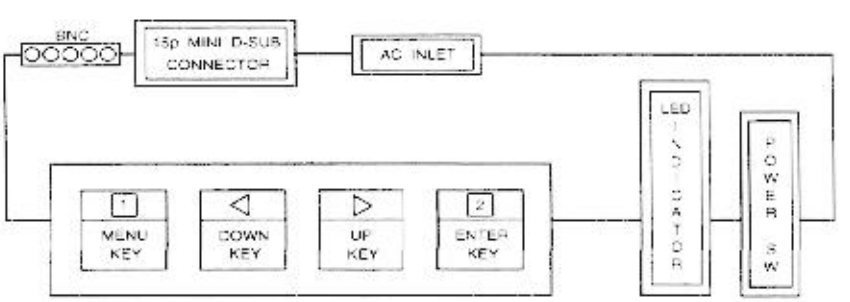
- Good focus by sophisticated gun and dynamic focus circuit
- High contrast
- Minimized distortion by correction circuit
- Good white uniformity
- Users enjoy full scan image for graphics

2-9 SPECIAL FUNCTION

- H / V CONVERGENCE CONTROL
- ROTATION CONTROL
- VESA/DDC1 & DDC2B (Display Data Channel) Compatible

# SPECIFICATION

## . DIAGRAM




.1 POWER SW, LED, z-key (MENU), ◁-key (DOWN), ▷-key (UP), and x-key (ENTER) are located on the front panel.

.2 Signal connector and AC inlet are located on the back side of the cabinet.

.3 OSD menu includes the following function.

CONTRAST BRIGHTNESS DEGAUSS
RECALL H. POSITION H. SIZE
V. POSITION V. SIZE V. PINCUSHION
TRAPEZOID PARALLELOGRAM ROTATION
COLOR SELECT DISPLAY FREQUENCY
VIDEO INPUT LEVEL VIDEO INPUT SELECT
H.CONVERGENCE V.CONVERGENCE
LANGUAGES

※) CONTRAST can be directly controlled with ◁/▷-key.

※) With sync signal, OSD menu appears by pushing z or x-key.
Without sync signal, self test menu appears by pushing any key.

※) OSD menu key can be locked by Power SW. ON while pushing x-key.

## 2. MECHANICAL SPECIFICATIONS

..... refer to the attached drawing

2.1 Dimension Height : 416 mm (16.4") typ
Width : 410 mm (16.1") typ
Depth : 444 mm (17.5") typ

2.2 Net Weight : 20.5 kg (45.2 lbs) typ

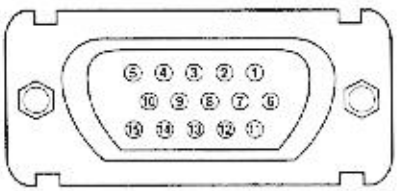
2.3 Maximum Viewable Phosphor Display Area
: 405.9mm (15.98") typ

## 3. CONNECTORS

3.1 Signal connector: 15P Mini D-Sub connector × 1
BNC CONNECTOR x 5

3.2 AC Inlet: CEE 22 typed connector

**<15P Mini D-Sub Pin assignment>**




| | | |
|---|---|---|
| 1 ... RED | 6 ... GROUND | 11 ... GROUND |
| 2 ... GREEN | 7 ... GROUND | 12 ... SDA (DDC) |
| 3 ... BLUE | 8 ... GROUND | 13 ... H. SYNC. |
| 4 ... GROUND | 9 ... – (OPEN) | 14 ... V. SYNC. |
| 5 ... GROUND (DDC) | 10 ... GROUND | 15 ... SCL (DDC) |

## 4. CRT SPECIFICATIONS

| | |
|---|---|
| Part No. | M41KZV01 X 11 |
| Type | 17"(viewable:15.0") 90°, 29e |
| Stripe Pitch | 0.25 mm AG Pitch |
| Phosphor | R, G, B Short Persistence (Hi-Eu RED) |
| CIE Color point | RED x:0.625 (typ.) y:0.340 (typ.)<br>Green x:0.290 (typ.) y:0.605 (typ.)<br>Blue x:0.150 (typ.) y:0.340 (typ.) |
| Bulb | SUPER DARK |
| Face | K COAT , Cylindrical screen |
| Total Transmission | 38.0 % (Typ.) |

## 5. ELECTRICAL SPECIFICATIONS

5.1 Standard conditions ... Except special items

| | |
|---|---|
| Display image | Green, full "H" characters with a border line. (7 x 9 dots)<br>Video signal : 100% duty<br>Display area : 300 mm x 225 mm |
| Video signal level | 0.7 V p-p |
| Contrast, Brightness | Contrast : Max., Brightness : detent point |
| Ambient Temperature | 20 ± 5°C (68 ± 9°F) |
| Input Voltage | AC 120 V, 60 Hz or 220 V 50 Hz |
| Terrestrial magnetism | Vertical field : northern hemisphere field (40μT)<br>(southern hemisphere field -40μT)<br>Horizontal field : no field |
| Viewing direction | Parallel to the CRT axis |
| Measurements | After an initial warming up time of more than 30 minutes. |
| Ambient light | 200 – 50 lx |
| Display mode | 1024 x 768 (60.02 kHz, 75.03 Hz) |

5.2 POWER

5.2.1 Power supply ... Commercial power source

| | |
|---|---|
| Input voltage | AC 90 - 132 V, AC 198 - 264 V |
| Power frequency | 50 Hz ± 3 Hz, 60 Hz ± 3 Hz |
| Input current | 2.2 A Max. (100V) |
| Inrush current (at 20° C) | 40 A op |
| Power consumption | 130 W (Typ.) |

5.2.2 Power Management for Power Saving ...

Power saving system is designed based upon VESA DPMS standard (Version : 1.0)

1) Power consumption and recovery time.

| ** APM State | SIGNALS | | | MONITOR POWER CONSUMPTION | RECOVERY TIME TO ON STATE | INDICATOR |
|---|---|---|---|---|---|---|
| | H. Sync | V. Sync | VIDEO | | | |
| ON | *3 NORMAL | *3 NORMAL | *2 ACTIVE | *4 100% | —— | Green |
| STAND-BY | No Sync or *5 < 6 kHz | > 40 Hz | BLANK | < 30 W | < 4s | Yellow |
| SUSPEND | > 10 kHz | No Sync or *5 < 20 Hz | BLANK | < 30 W | < 4s | Yellow |
| OFF | No Sync or *5 < 6 kHz | No Sync or *5 < 20 Hz | BLANK | < 8 W | < 20s | Yellow |

** The transition time from ON state to each APM state is 5 seconds minimum.

*1 : APM : Advanced Power Management.

*2 : Means. Condition of power consumption for ON state.
DISPLAY IMAGE : WHITE full "H" characters with a border line (7 × 9 dots).

*3 : NORMAL : See "7.4 ACCEPTABLE TIMING".

*4 : Power Consumption is measured at AC 100-240V.

*5 : Power saving operation is done at least less than specified value in the list.

5.3 Standard timing (Standard mode)

- Following 1 mode (7 modes) are preset (reserved) in the memory as standard timing at the factory.
- Fig-1 shows a definition of timing and signal level.
- Electrical performance is specified. This SPECIFICATION is specified at STD (1024 x 768) mode unless otherwise mentioned. (MODE-1)

# TIMING CHART

| | |
|---|---|
| A | Period |
| B | Blanking |
| C | Sync Width |
| D | Back Porch |
| E | Active |
| F | Front Potch |

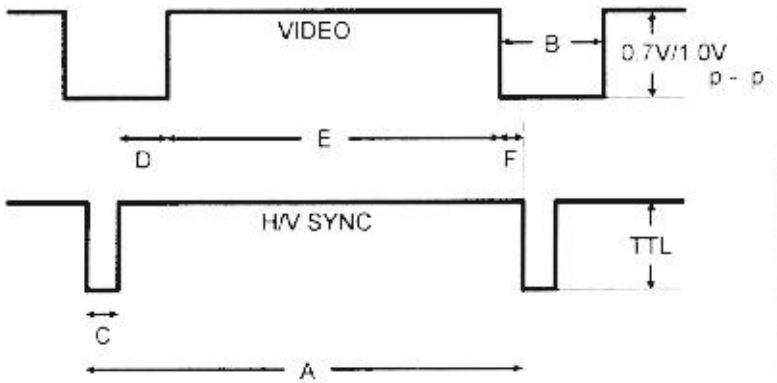



Fig.1

| | | PRESET | RESERVATION | RESERVATION |
|---|---|---|---|---|
| | | MODE - 1 | MODE - 2 | MODE - 3 |
| | | 1024 × 768 (75) | 640 × 480 (60) | 640 × 480 (75) |
| | DOT CLOCK | 78.7500 MHz | 25.1745 MHz | 31.5000 MHz |
| H | f H | 60.0229 kHz | 31.4681 kHz | 37.5000 kHz |
| H | A - PERIOD | 16.660 µs ( 1,312 dots ) | 31.778 µs ( 800 dots ) | 26.667 µs ( 840 dots ) |
| H | B - BLANKING TIME | 3.657 µs ( 288 dots ) | 6.356 µs ( 160 dots ) | 6.349 µs ( 200 dots ) |
| H | C - SYNC WIDTH | 1.219 µs ( 96 dots ) | 3.813 µs ( 96 dots ) | 2.032 µs ( 64 dots ) |
| H | D - BACK PORCH | 2.235 µs ( 176 dots ) | 1.946 µs ( 49 dots ) | 3.810 µs ( 120 dots ) |
| H | E - ACTIVE TIME | 13.003 µs ( 1,024 dots ) | 25.423 µs ( 640 dots ) | 20.317 µs ( 640 dots ) |
| H | F - FRONT PORCH | 0.203 µs ( 16 dots ) | 0.596 µs ( 15 dots ) | 0.508 µs ( 16 dots ) |
| V | f V | 75.0285 Hz | 59.9393 Hz | 75.0000 Hz |
| V | A - PERIOD | 13.328 ms ( 800 lines ) | 16.684 ms ( 525 lines ) | 13.333 ms ( 500 lines ) |
| V | B - BLANKING TIME | 0.533 ms ( 32 lines ) | 1.430 ms ( 45 lines ) | 0.533 ms ( 20 lines ) |
| V | C - SYNC WIDTH | 0.050 ms ( 3 lines ) | 0.064 ms ( 2 lines ) | 0.080 ms ( 3 lines ) |
| V | D - BACK PORCH | 0.466 ms ( 28 lines ) | 1.176 ms ( 37 lines ) | 0.427 ms ( 16 lines ) |
| V | E - ACTIVE TIME | 12.795 ms ( 768 lines ) | 15.254 ms ( 480 lines ) | 12.800 ms ( 480 lines ) |
| V | F - FRONT PORCH | 0.017 ms ( 1 lines ) | 0.191 ms ( 6 lines ) | 0.027 ms ( 1 lines ) |
| | SYNC POLARITY(H/V) | Positive / Positive | Negative / Negative | Negative / Negative |

| | | RESERVATION | RESERVATION | RESERVATION |
|---|---|---|---|---|
| | | MODE - 4 | MODE - 5 | MODE - 6 |
| | | 800 × 600 (75) | MAC 832 × 624 | 1024 × 768 (70) |
| | DOT CLOCK | 49.5000 MHz | 57.2832 MHz | 75.0000 MHz |
| H | f H | 46.8750 kHz | 49.7250 kHz | 56.4759 kHz |
| H | A - PERIOD | 21.333 µs ( 1,056 dots ) | 20.111 µs ( 1,152 dots ) | 17.707 µs ( 1,328 dots ) |
| H | B - BLANKING TIME | 5.172 µs ( 256 dots ) | 5.586 µs ( 320 dots ) | 4.053 µs ( 304 dots ) |
| H | C - SYNC WIDTH | 1.616 µs ( 80 dots ) | 1.117 µs ( 64 dots ) | 1.813 µs ( 135 dots ) |
| H | D - BACK PORCH | 3.232 µs ( 160 dots ) | 3.910 µs ( 224 dots ) | 1.920 µs ( 144 dots ) |
| H | E - ACTIVE TIME | 16.162 µs ( 800 dots ) | 14.524 µs ( 832 dots ) | 13.653 µs ( 1,024 dots ) |
| H | F - FRONT PORCH | 0.323 µs ( 16 dots ) | 0.559 µs ( 32 dots ) | 0.320 µs ( 24 dots ) |
| V | f V | 75.0000 Hz | 74.5502 Hz | 70.0694 Hz |
| V | A - PERIOD | 13.333 ms ( 625 lines ) | 13.414 ms ( 667 lines ) | 14.272 ms ( 806 lines ) |
| V | B - BLANKING TIME | 0.533 ms ( 25 lines ) | 0.865 ms ( 43 lines ) | 0.673 ms ( 38 lines ) |
| V | C - SYNC WIDTH | 0.064 ms ( 3 lines ) | 0.060 ms ( 3 lines ) | 0.106 ms ( 6 lines ) |
| V | D - BACK PORCH | 0.448 ms ( 21 lines ) | 0.784 ms ( 39 lines ) | 0.513 ms ( 29 lines ) |
| V | E - ACTIVE TIME | 12.800 ms ( 600 lines ) | 12.549 ms ( 624 lines ) | 13.599 ms ( 768 lines ) |
| V | F - FRONT PORCH | 0.021 ms ( 1 lines ) | 0.020 ms ( 1 lines ) | 0.053 ms ( 3 lines ) |
| | SYNC POLARITY(H/V) | Positive / Positive | Negative / Negative | Negative / Negative |

| | | RESERVATION | RESERVATION |
|---|---|---|---|
| | | MODE - 7 | MODE - 8 |
| | | MAC 1024 × 768 | 1280 × 1024 (75) |
| | DOT CLOCK | 80.0000 MHz | 135.0000 MHz |
| H | f H | 60.2410 kHz | 79.9763 kHz |
| H | A - PERIOD | 16.600 µs ( 1,328 dots ) | 12.504 µs ( 1,688 dots ) |
| H | B - BLANKING TIME | 3.800 µs ( 304 dots ) | 3.022 µs ( 408 dots ) |
| H | C - SYNC WIDTH | 1.200 µs ( 96 dots ) | 1.067 µs ( 144 dots ) |
| H | D - BACK PORCH | 2.200 µs ( 176 dots ) | 1.837 µs ( 248 dots ) |
| H | E - ACTIVE TIME | 12.800 µs ( 1,024 dots ) | 9.481 µs ( 1,280 dots ) |
| H | F - FRONT PORCH | 0.400 µs ( 32 dots ) | 0.119 µs ( 16 dots ) |
| V | f V | 74.9266 Hz | 75.0247 Hz |
| V | A - PERIOD | 13.346 ms ( 804 lines ) | 13.329 ms ( 1,066 lines ) |
| V | B - BLANKING TIME | 0.598 ms ( 36 lines ) | 0.525 ms ( 42 lines ) |
| V | C - SYNC WIDTH | 0.050 ms ( 3 lines ) | 0.038 ms ( 3 lines ) |
| V | D - BACK PORCH | 0.498 ms ( 30 lines ) | 0.475 ms ( 38 lines ) |
| V | E - ACTIVE TIME | 12.749 ms ( 768 lines ) | 12.804 ms ( 1,024 lines ) |
| V | F - FRONT PORCH | 0.050 ms ( 3 lines ) | 0.013 ms ( 1 lines ) |
| | SYNC POLARITY(H/V) | Negative / Negative | Positive / Positive |

| | | ADJUSTMENT | ADJUSTMENT | ADJUSTMENT |
|---|---|---|---|---|
| | | HV8 - 1 | HV8 - 2 | HV8 - 4 |
| | DOT CLOCK | 22.6000 MHz | 40.2479 MHz | 86.0645 MHz |
| H | f H | 29.5039 KHz | 38.9999 KHz | 64.5161 KHz |
| H | A - PERIOD | 33.894 µs ( 766 dots ) | 25.641 µs ( 1,032 dots ) | 15.500 µs ( 1,334 dots ) |
| H | B - BLANKING TIME | 6.018 µs ( 136 dots ) | 5.988 µs ( 241 dots ) | 3.602 µs ( 310 dots ) |
| H | C - SYNC WIDTH | 4.115 µs ( 93 dots ) | 2.832 µs ( 114 dots ) | 1.185 µs ( 102 dots ) |
| H | D - BACK PORCH | 1.283 µs ( 29 dots ) | 2.435 µs ( 98 dots ) | 1.975 µs ( 170 dots ) |
| H | E - ACTIVE TIME | 27.876 µs ( 630 dots ) | 19.653 µs ( 791 dots ) | 11.898 µs ( 1,024 dots ) |
| H | F - FRONT PORCH | 0.619 µs ( 14 dots ) | 0.721 µs ( 29 dots ) | 0.442 µs ( 38 dots ) |
| V | f V | 48.0520 Hz | 77.0749 Hz | 105.0751 Hz |
| V | A - PERIOD | 20.811 ms ( 614 lines ) | 12.974 ms ( 506 lines ) | 9.517 ms ( 614 lines ) |
| V | B - BLANKING TIME | 0.915 ms ( 27 lines ) | 0.744 ms ( 29 lines ) | 0.481 ms ( 31 lines ) |
| V | C - SYNC WIDTH | 0.102 ms ( 3 lines ) | 0.103 ms ( 4 lines ) | 0.047 ms ( 3 lines ) |
| V | D - BACK PORCH | 0.712 ms ( 21 lines ) | 0.513 ms ( 20 lines ) | 0.357 ms ( 23 lines ) |
| V | E - ACTIVE TIME | 19.896 ms ( 587 lines ) | 12.231 ms ( 477 lines ) | 9.037 ms ( 583 lines ) |
| V | F - FRONT PORCH | 0.102 ms ( 3 lines ) | 0.128 ms ( 5 lines ) | 0.078 ms ( 5 lines ) |
| | SYNC POLARITY(H/V) | Negative / Negative | Negative / Negative | Negative / Negative |

| | | ADJUSTMENT |
|---|---|---|
| | | HV8 - 6 |
| | DOT CLOCK | 190.9800 MHz |
| H | f H | 86.0270 KHz |
| H | A - PERIOD | 11.624 µs ( 2,220 dots ) |
| H | B - BLANKING TIME | 2.932 µs ( 560 dots ) |
| H | C - SYNC WIDTH | 0.984 µs ( 188 dots ) |
| H | D - BACK PORCH | 1.623 µs ( 310 dots ) |
| H | E - ACTIVE TIME | 8.692 µs ( 1,660 dots ) |
| H | F - FRONT PORCH | 0.325 µs ( 62 dots ) |
| V | f V | 165.1191 Hz |
| V | A - PERIOD | 6.056 ms ( 521 lines ) |
| V | B - BLANKING TIME | 0.430 ms ( 37 lines ) |
| V | C - SYNC WIDTH | 0.035 ms ( 3 lines ) |
| V | D - BACK PORCH | 0.384 ms ( 33 lines ) |
| V | E - ACTIVE TIME | 5.626 ms ( 484 lines ) |
| V | F - FRONT PORCH | 0.012 ms ( 1 lines ) |
| | SYNC POLARITY(H/V) | Negative / Negative |

.4 Acceptable timing

- If your timing is within following specification, this CRT display can automatically function with a certain size and position.

Horizontal: Sync frequency: 30.0 ~ 66.0 kHz
Blanking Time: ≥ 3.0 μs
Back Porch: ≥ 1.25 μs
Front Porch: ≤ Back Porch
Sync Width: ≥ 1.2 μs

Vertical: Sync frequency: 50.0 ~ 160.0 Hz
Blanking Time: ≥ 0.5 ms
Back Porch: ≥ 0.4 ms
Sync Width: ≥ 0.045 ms

- Several items like size, position and distortion can be adjusted through OSD menu, and if you want to keep it, please push the key 2 for memory, or keep the key untouched for about 20 seconds, it is automatically memorized.

NOTE : In case of RECALL, the key is untouched for about 30 seconds, RECALL function wil be cancelled.

Please note, however, that there is the case you can not get the size and/or position you want.
(for example, in case Display video Time is too short, you can't get bigger size of the image.)

- The CRT adopted in this CRT display is designed to minimize the moire phenomenon at suitable size for typical display modes. However, there might be a display format among many formats, in which the moire phenomenon appears on this display.

.5 Signal level and input impedance

.5.1 Video Signal level

- This CRT display is adjusted at the factory using 0.7V p-p Video Signal. Black level is 0V.
- This CRT display is compatible with 1.0V p-p Video Signal by using Video Input level selection.

.5.2 Sync Signal level

- H/V Separate, H/V Mixed : TTL level
- Sync on Green : 0.3 V p-p ± 0.015 V

.5.3 Input impedance

- Video input: 75 Ω
- Sync input: ≥ 1 kΩ

5.6 Display performance

5.6.1 Display area

1) PRESET TIMING

MODE 1

WIDTH : 300 mm ± 5 mm

HEIGHT : 225 mm ± 5 mm

5.6.2 Centering

1) PRESET TIMING (MODE1)

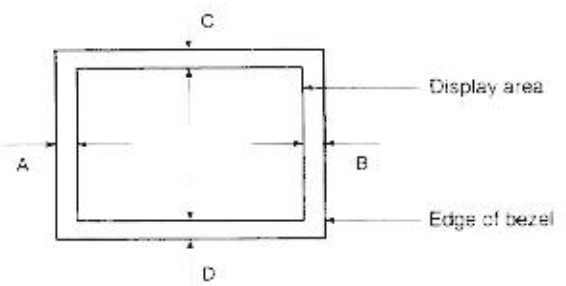
|A – B| ≤ 4 mm

|C – D| ≤ 4 mm

2) RESERVATION TIMING (MODE2~8)

|A – B| ≤ 7 mm

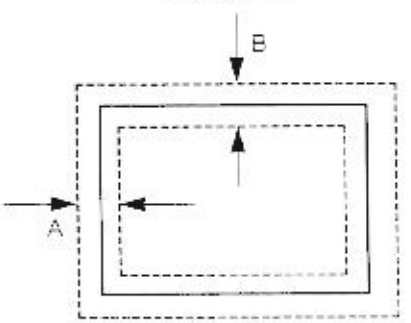
|C – D| ≤ 7 mm




5.6.3 Distortion

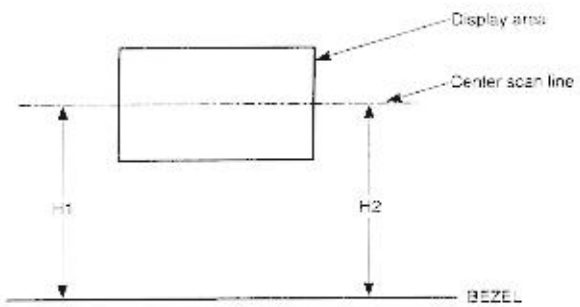
A ≤ 2.0 mm

B ≤ 2.5 mm



5.6.4 Rotation

|H1 – H2| ≤ 2.0 mm



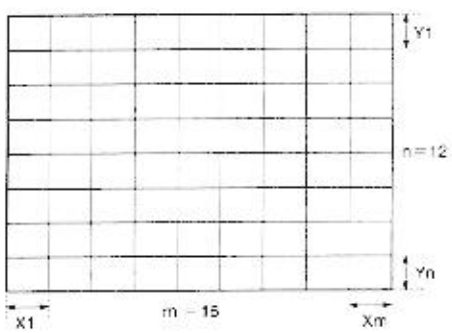

5.6.5 Linearity

Horizontal linearity

$$= \frac{X\,max. - X\,min.}{X\,max. + X\,min.} \times 100\ \% \leq 6\ \%$$

Vertical linearity

$$= \frac{Y\,max. - Y\,min.}{Y\,max. + Y\,min.} \times 100\ \% \leq 5\ \%$$




<Conditions>

Display image ------- crosshatch pattern

Maximum and minimum values should not be adjacent to each other.

X max. is maximum value among X1~Xm

X min. is minimum value among X1~Xm

Y max. is maximum value among Y1~Yn

Y min. is minimum value among Y1~Yn

## 5.7 General performance

5.7.1 Video output

| | |
|---|---|
| Bandwidth | 135 MHz (Typ.) |

5.7.2 Maximum luminance

| | |
|---|---|
| Value | 130 cd/m² (Typ.) for 5% white field at the center of the display area.<br>103 cd/m² (Typ.) for 100% white field at the center of the display area.<br>Specified by 9300 K + 9 MPCD |
| Conditions | Display image : White full flat field<br>Luminance : Max. (Contrast : Max.)<br>(Brightness : Detent point) |

5.7.3 Minimum luminance

| | |
|---|---|
| Value | ≤ 26 cd/m² at the center of the display area.<br>Specified by 9300 K + 9 MPCD |
| Conditions | Display image : White full flat field<br>Luminance : Min. (Contrast : Min.)<br>(Brightness : Detent point) |

5.7.4 Brightness variation

| | |
|---|---|
| Value | 75 % (Min.) Variation = C/A X 100 |
| Conditions | Display image : White full flat field<br>Luminance : MAX (Contrast : MAX)<br>(Brightness : Detent point)<br>A : Luminance at center position<br>C : Luminance at position of lowest brightness |

5.7.5 Display area regulation

| | Display area variation | Range of variation |
|---|---|---|
| Due to Luminance | within 1.0% | 26~103 cd/m² (white flat field) |
| Due to Power Supply | within 0.5% | AC : 90-132 V or 180-264 V |
| Due to Temperature | within 1.0% | 20 ± 15° C |

5.7.6 Color Point

< Conditions >

Display image : White flat field at the center of the display area

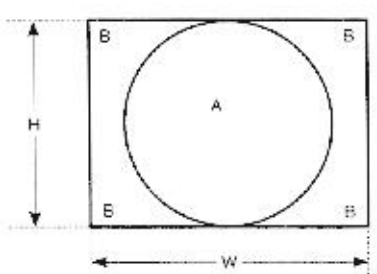
Luminance : Brightness Detent point.

| Contrast | max | min | max~min |
|---|---|---|---|
| Value | 9300 K + 8 MPCD<br>x = 0.285 ± 0.020<br>y = 0.296 ± 0.020 | 9300 K + 8 MPCD<br>x = 0.253 ± 0.020<br>y = 0.298 ± 0.020 | Δx = ± 0.020<br>Δy = ± 0.020 |

5.7.7 Misconvergence

Center area of display (A) : 0.3 mm (Max.)

Corner area of display (B) : 0.4 mm (Max.)




<Conditions>

Display image : Crosshatch pattern mixed with R, G and B colors.

Convergence gauge : KLEIN CM7AG or equivalent.

Display area : W x H 300 x 225 mm

5.7.8 White Uniformity

xa - xc ≤ ± 0.015

ya - yc ≤ ± 0.015

xa : x coordinate at the CRT center

xc : x coordinate at any other point

ya : y coodinate at the CRT center

yc : y coordinate at any other point

<Conditions>

Display image : White flat field

Luminance : 103 cd/m² at the center of display area

Display area : 300X225mm

5.7.9 Purity

Conspicuous mislanding shall not be visible within display area at a distance of 60cm from CRT surface.

<Conditions>

Display image : Red / Green / Blue flat field

Luminance : Contrast max, Brightness Detent point

Display area : 300X225mm

5.7.10 Jitter

Invisible at a distance of 60 cm from CRT surface.

## 6. ENVIRONMENTS

6.1 Ambient temperature, humidity and altitude

| | Operating | Storage and shipment |
|---|---|---|
| Temperature | 5 ~ 35° C *<br>(41 ~ 95° F) | -20 ~ +60° C<br>(-4 ~ 140° F) |
| Humidity | 5 ~ 90 % * | 5 ~ 90 % * |
| Altitude | 3,000 m (Max.)<br>(10,000 ft) | 12,000 m (Max.)<br>(40,000 ft) |

* Non-condensation

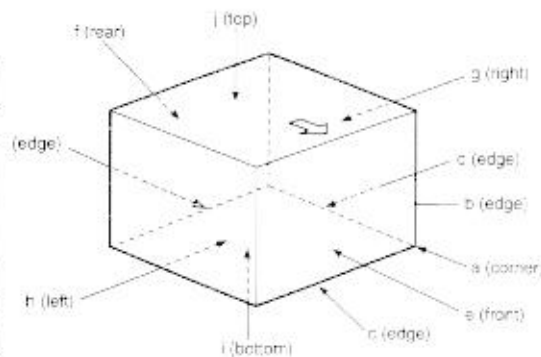
6.2 Vibration and shock

6.2.1 Vibration

| | Order of tests | Direction of vibration | | Acceleration: Non-operation | Acceleration: Storage and shipment | Frequency | Sweep | Test time |
|---|---|---|---|---|---|---|---|---|
| Unpacked | 1 | Vertical | Up to down | 2.9 m/s² (0.3 G) | | 5 - 55 Hz | 120 s | 30 min. |
| | 2 | Horizontal | Front to back | | | | | 15 min. |
| | 3 | | Right to left | | | | | |
| Packed (No Hold) | 1 | Vertical | Up to down | | 1.0Grms | 5-250 Hz | Random | 40 min. |
| | 2 | Horizontal | Front to back | | | | | 60 min. |
| | 3 | | Right to left | | | | | 60 min. |

6.2.2 Shock(Drop test)

| Unpacked | 20 G One time for each face (6 faces) (non-operation) | | | |
|---|---|---|---|---|
| Packed | Order of drop | Face to drop is to face the floor. (See the figure) | Height | Number of drop |
| | 1 | a, b, c, d, e, f g, h, i, j | 61 cm | 1 time for each |




## 7. REGULATORY STANDARDS

7.1 Safety standards

Applicable standards

- UL 1950, Listing
- CSA 22.2 No. 950, Certification
- TüV (EN60950 IEC950)/GS (ZH1)
- NORDIC (SEMKO, NEMKO, DEMKO, FIMKO)

7.2 X-Ray stanards Applicable standards

- DHHS, 21 CFR Subchapter J
- HC
- PTB; Aporoval

7.3 EMC standards

Designed to meet following standards

- VCCI class 2
- FCC part 15, subpart B, class-B
- IC class B
- CISPR22 class B (EN55022)
- CE Marking

## 8. POWER CORD

- Northern Hemisphere Version···UL/CSA approved power cord (Wall Type)
  (North America and Japan) Length : 1.8meters
- European Version···VDE approved power cord (PC Type)
  Length : 1.8meters
- Australia, New Zealand Verrsion···None

## 9. SIGNAL CABLE

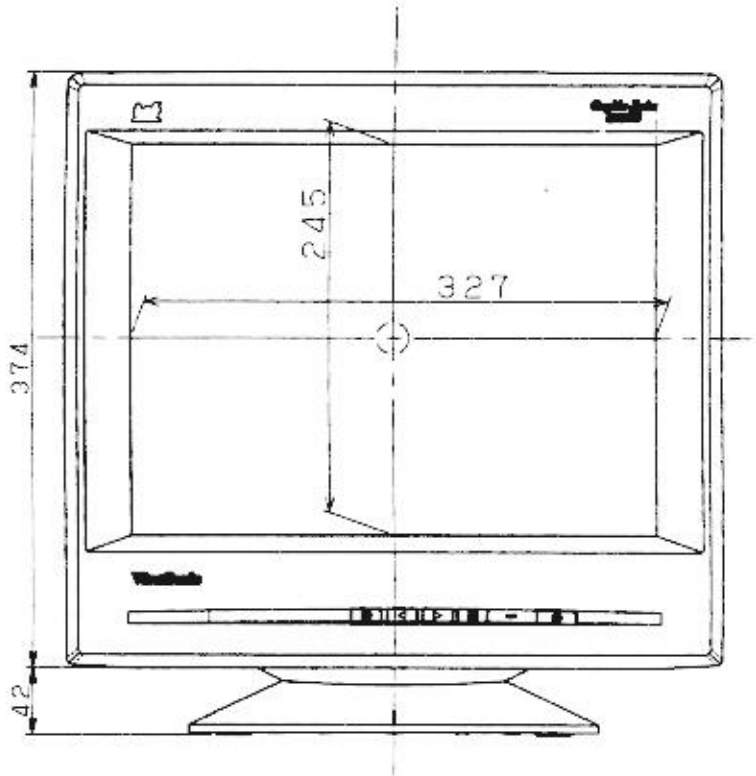
Signal cable with Mini D-Sub 15P connectors at both ends

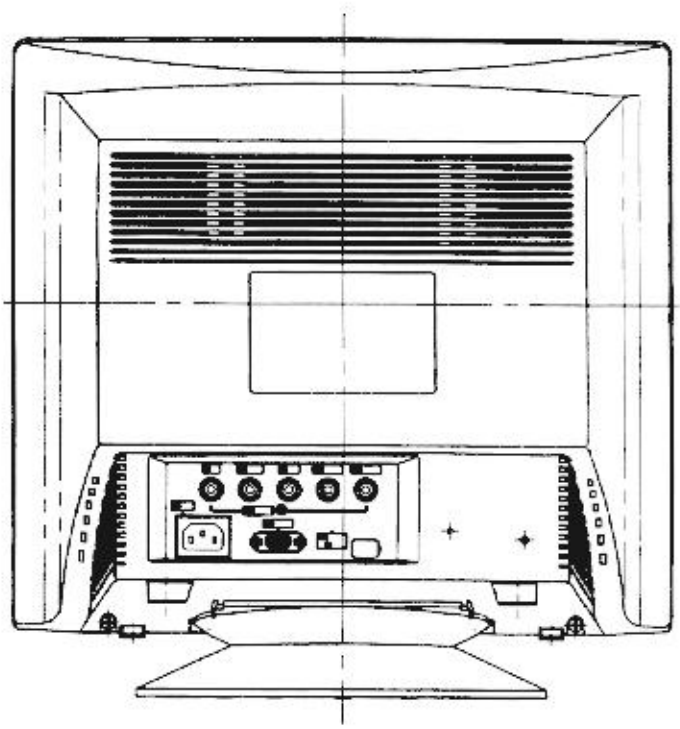
Length : 1.8 meter (4.92 feet)

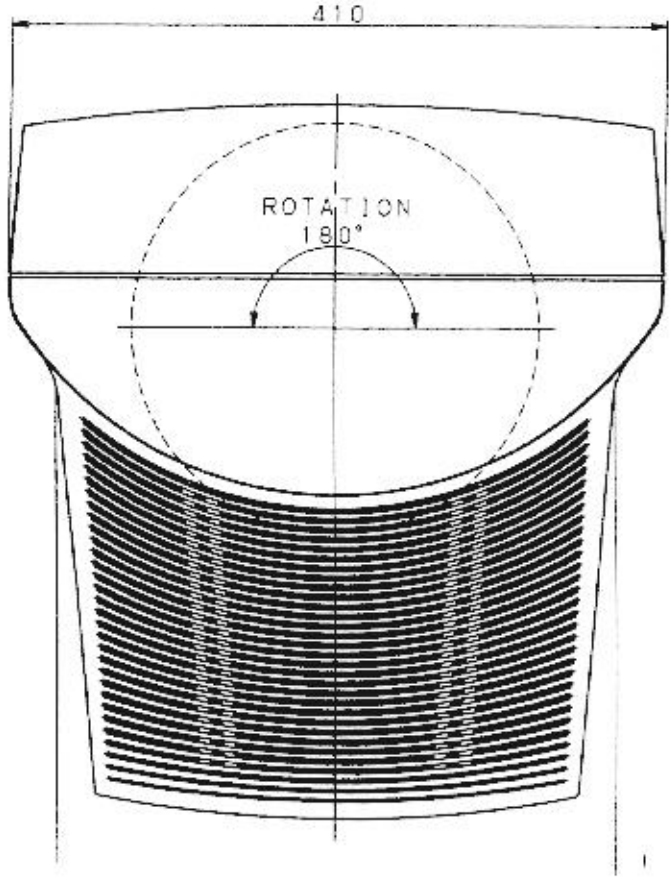
## 10. RELIABILITY

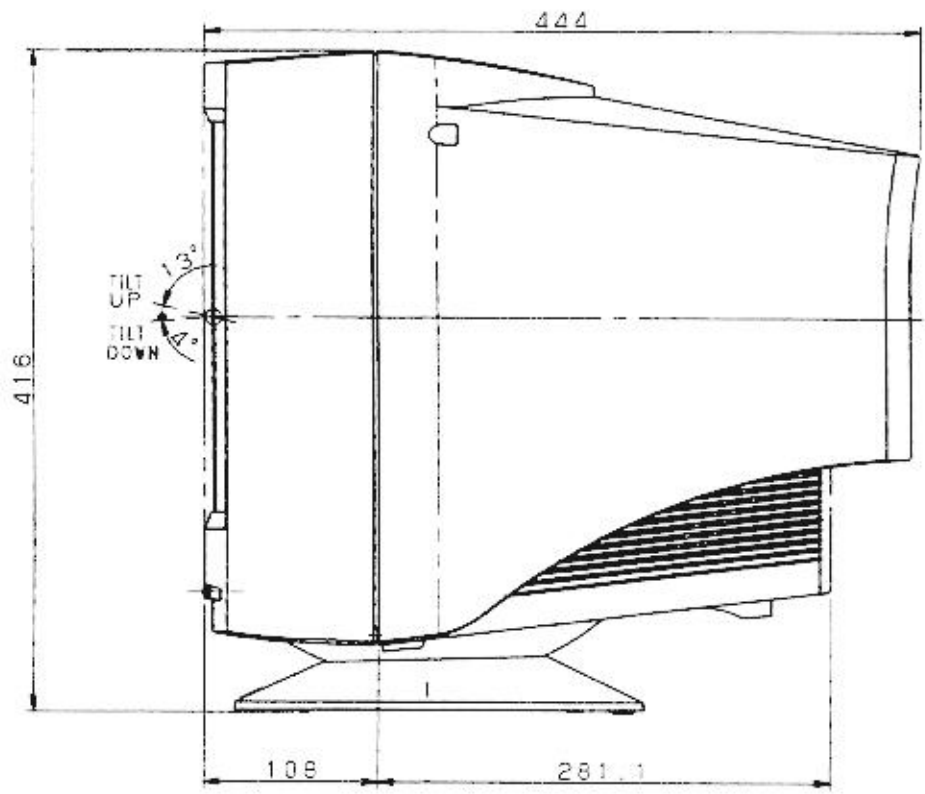
>55 000hrs (demonstrated MTBF : without CRT)

# DIMENSIONS




410
ROTATION
180°

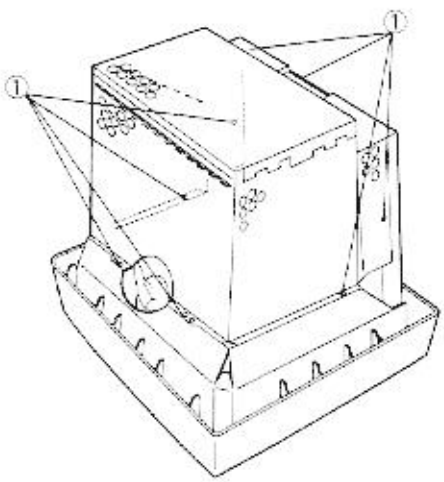

444
416
TILT
UP
13°
TILT
DOWN
4°
108
281.1

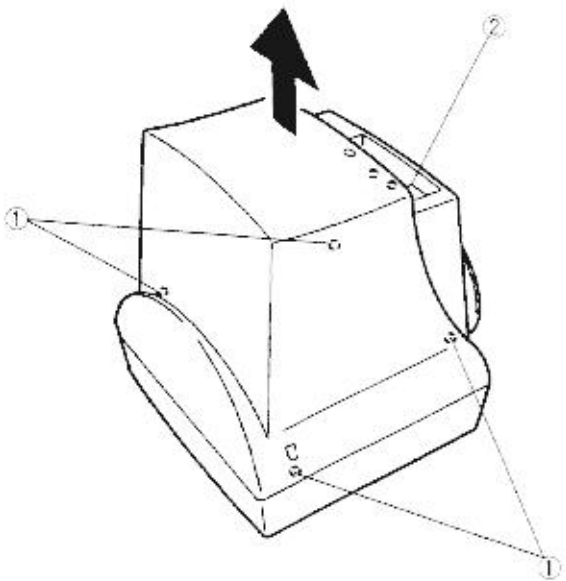
# DISASSEMBLY INSTRUCTIONS

## . Rear cover removal

*lote: Spread a mat underneath to avoid damaging the CRT surface.*

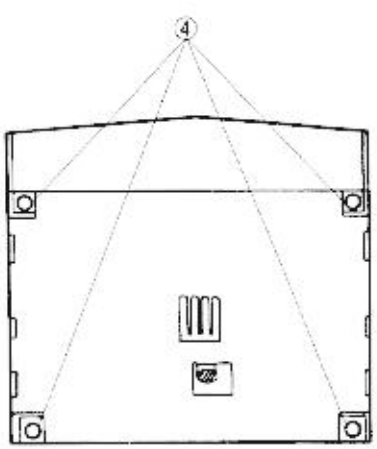
) Remove four large screws ① and small screw ② from the rear cover.
) Remove the cover.
) Remove nine screws ③ from the shield case.
) Remove the shield case.



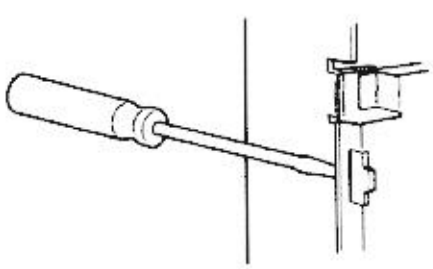




## . Video PCB removal

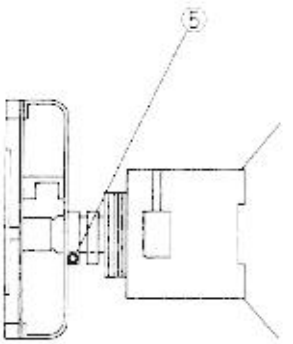
1) Remove four screws ④ securing the shield cover.
2) Desolder (B) and Remove the shield cover (A).

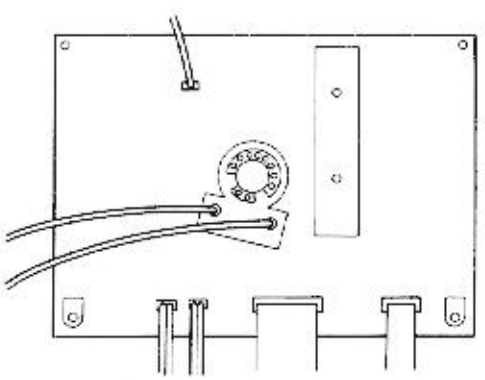


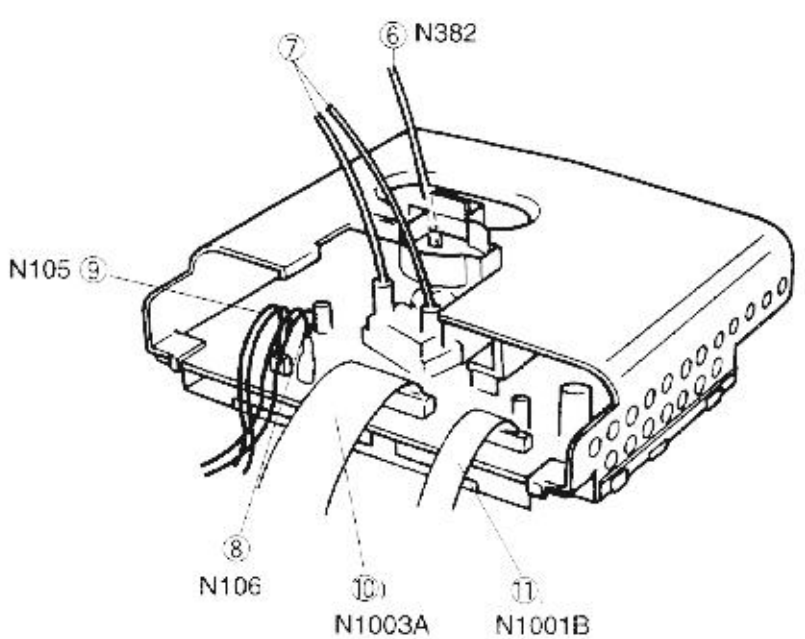

**(A)**



3) Loosen the screw ⑤ securing the CRT neck and the shield case.
4) Remove the PCB block from the CRT.
5) Remove the N382 connector ⑥.
6) Remove two focus leads ⑦.
7) Remove ground connector ⑧ (N106) connected to the PCB.
8) Remove N105 connector ⑨.
9) Remove N1003A connector ⑩.
10) Remove N1001B connector ⑪.
11) Remove the PCB from the shield case.

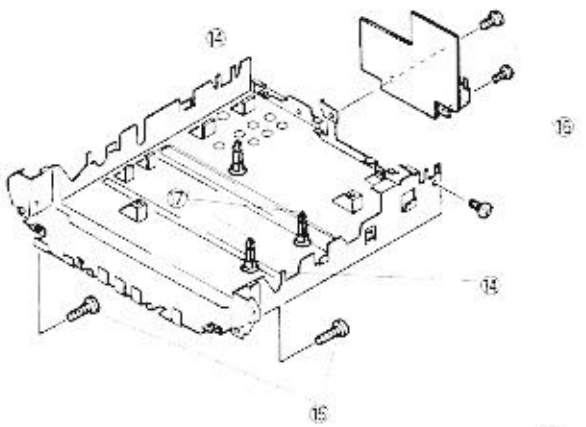


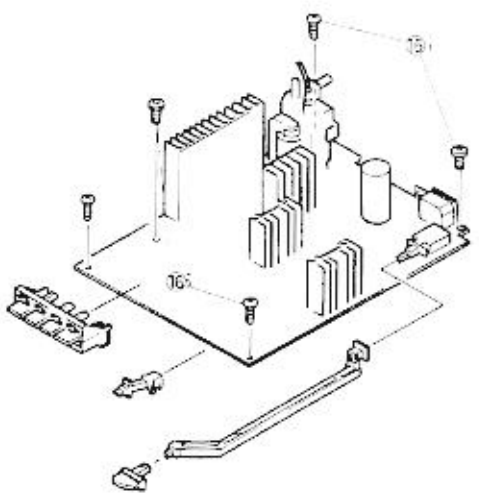



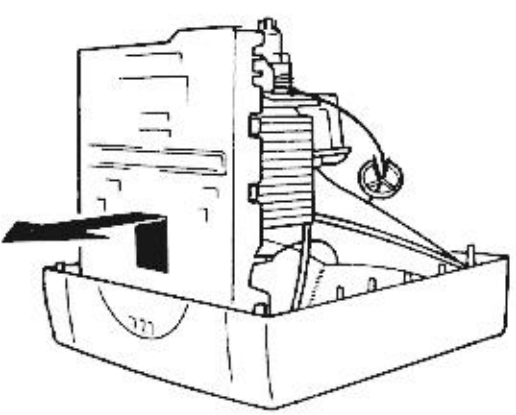


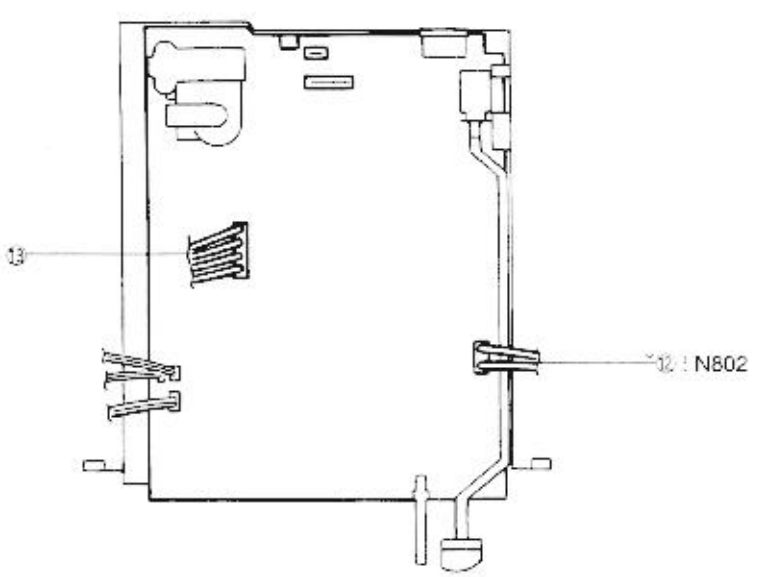
### 3. Main PCB Removal

1) Remove the connector ⑫ (N802) of the degauss coil.
2) Remove the DY connector ⑬.
3) Remove the anode cap.
4) Remove two ground connector ⑭.
5) Move the CRT face down and remove two screws ⑮ securing the bottom fitting metal.
6) Remove the fitting metal and the PCB from the cabinet.
7) Remove ten screws ⑯ securing the fitting metal and PCB.
8) Remove there clamper ⑰ the fitting metal and PCB.
9) Remove the PCB ⑱ with the figure referenced.



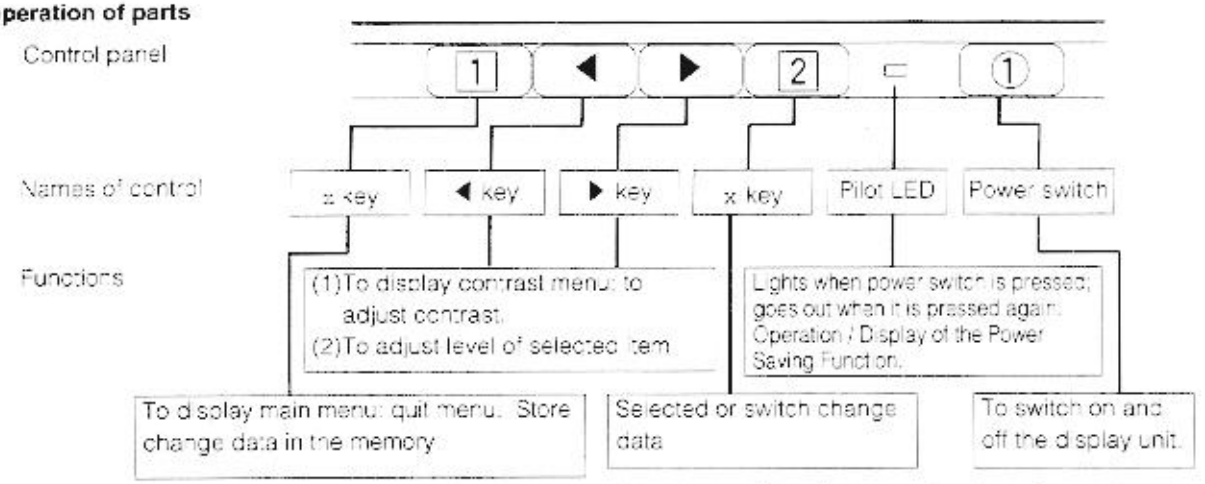





# CONTROL LOCATION

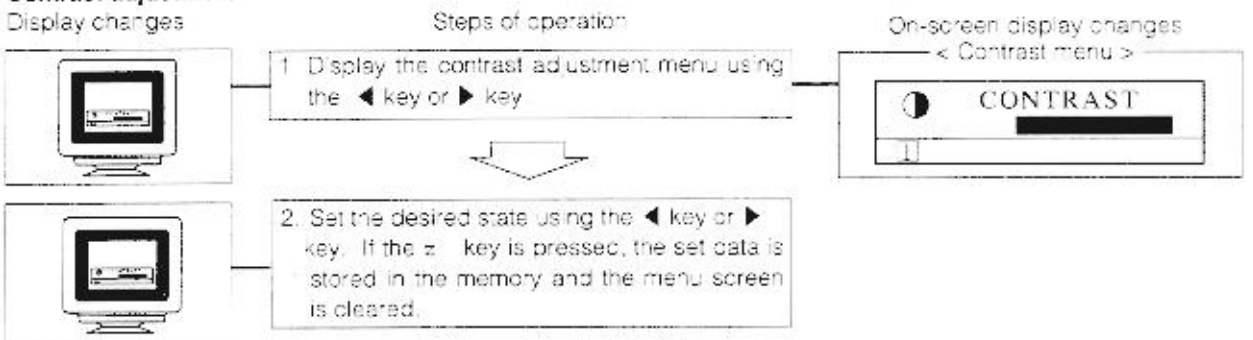
**Basic operation of parts**


Control panel
1
◀
▶
2
⏻
Names of control
z key
◀ key
▶ key
x key
Pilot LED
Power switch
Functions
(1)To display contrast menu: to adjust contrast.
(2)To adjust level of selected item
Lights when power switch is pressed; goes out when it is pressed again. Operation / Display of the Power Saving Function.
To display main menu: quit menu. Store change data in the memory
Selected or switch change data
To switch on and off the display unit.

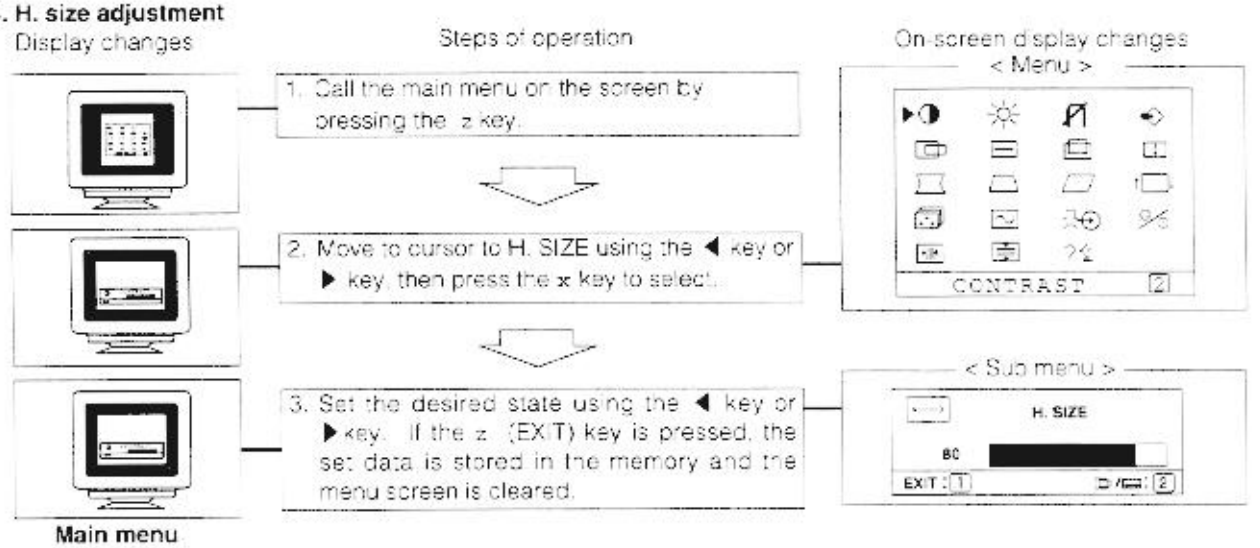
* For a detailed description of the functions of the z key, ◀ key, ▶ key, and x key, refer to the next

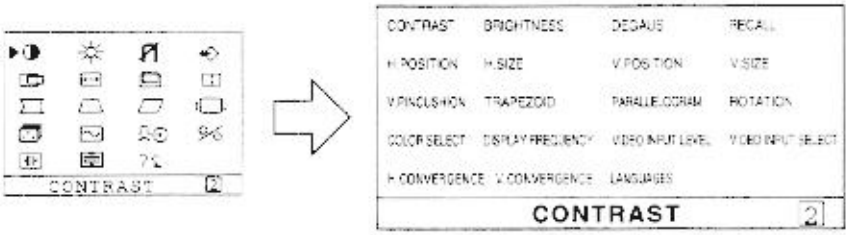
**Examples of on-screen operation**

**A. Contrast adjustment**


Display changes
Steps of operation
On-screen display changes
< Contrast menu >
1. Display the contrast adjustment menu using the ◀ key or ▶ key
CONTRAST
2. Set the desired state using the ◀ key or ▶ key. If the z key is pressed, the set data is stored in the memory and the menu screen is cleared.

**B. H. size adjustment**


Display changes
Steps of operation
On-screen display changes
< Menu >
1. Call the main menu on the screen by pressing the z key.
2. Move to cursor to H. SIZE using the ◀ key or ▶ key, then press the x key to select.
CONTRAST
< Sub menu >
H. SIZE
80
EXIT : z
ADJ : x
3. Set the desired state using the ◀ key or ▶ key. If the z (EXIT) key is pressed, the set data is stored in the memory and the menu screen is cleared.
Main menu



## CAUTION FOR ADJUSTMENT AND REPAIR

1. Degaussing is inevitably required at purity adjustment or convergence adjustment.
2. If you check or adjust electrical specification or function, more than 20 minutes burn-in is required.
3. Reforming of the lead wire is required after your repair work.
4. Prior to starting work, be sure to check that the input signal is at the specified timing and that the polarity is as specified in all modes.
5. Brightness control : After mounting the rear cover, brightness tends to decrease about 5 cd/m² on a flat white field and about 1 cm/m² on a white raster field. This should be taken into consideration.
6. Brightness stabilizing time : It takes about 20 to 50 seconds for the brightness to stabilize after turning the power off for 5 seconds (AC). Therefore, care should be taken to this.
7. Aging should be made in white raster of 30 – 50 cd/m² and raster size, 320 x 240 mm before adjusting the ITC.
8. Set the CONTRAST to MAX and BRIGHTNESS to CENTER using the O.S.D.

## CAUTION FOR SERVICING

When servicing or replacing the CRT, high voltage sometimes remains on the anode. So, completely discharge high voltage before servicing or replacing the CRT so as to prevent a shock to the service person.

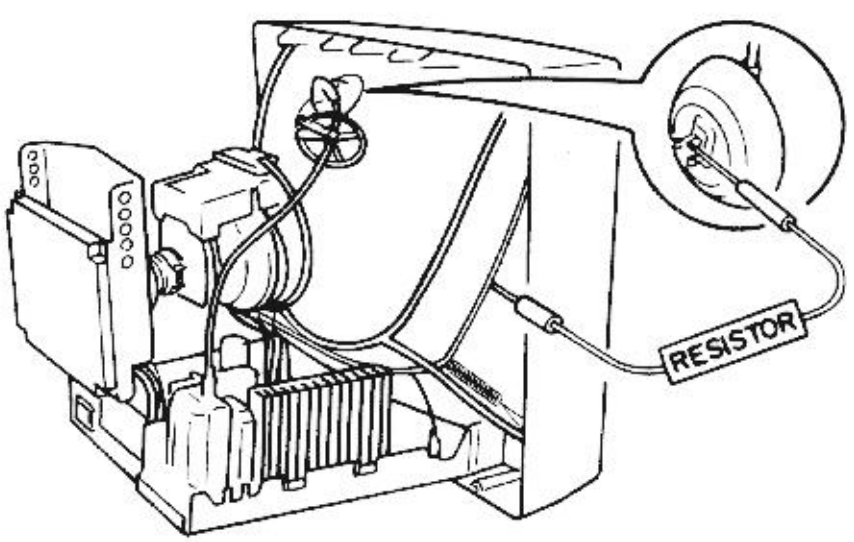
### CRT Anode Discharge

1. When you check the CRT anode or replace the CRT, discharge the CRT anode to the external conductive coating (aquadag) of CRT, especially when checked right after power turn-off.
2. Ground one end of a jumper wire which has a resistor (30 kV < resisting pressure 100 MΩ) and connect the other point to the CRT anode.

*Note: Grounding must be done first.*

This model has a section that does not share a common ground with the power supply section. The different sections are referred to as the HOT section and the COLD section in the precautions below.

1. Do not touch the HOT section and the COLD section at the same time. You may be hit by an electric shock.
2. Do not short the HOT section to the COLD section. This could blow the fuse or damage parts.
3. Never measure the HOT section and the COLD section at the same time when using tools such as oscilloscopes or multimeters.
4. Always unplug the unit before beginning any operation such as removing the chassis.



# ADJUSTMENT AND CHECK PROCEDURE

## INTRODUCTION

- This monitor is controlled by a microcomputer. With the exception of purity/convergence/focus all is digitally adjusted.
  Therefore a computer, the dedicated control software, the dedicated interface, a 9~12 V power supply, and a signal generator are required servicing.

## TOOLS REQUIRED

- **Computer**
  The control software is IBM PC compatible only. Therefore, it is not compatible with any other operating systems. For further information please contact our sales office.

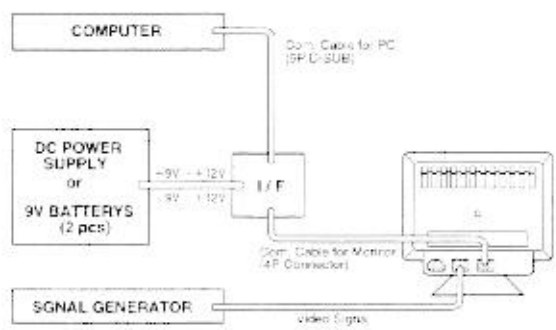
- **Control Software**
  The HV8 chassis can only use "GT775 adjustment program disk". No other program can access the EEPROM on the monitor. For further information please contact our sales office.

- **Interface**
  The interface is dedicated to work only with the control software and the HV chassis. There are no substitutes for this interface. For further information please contact our sales office.

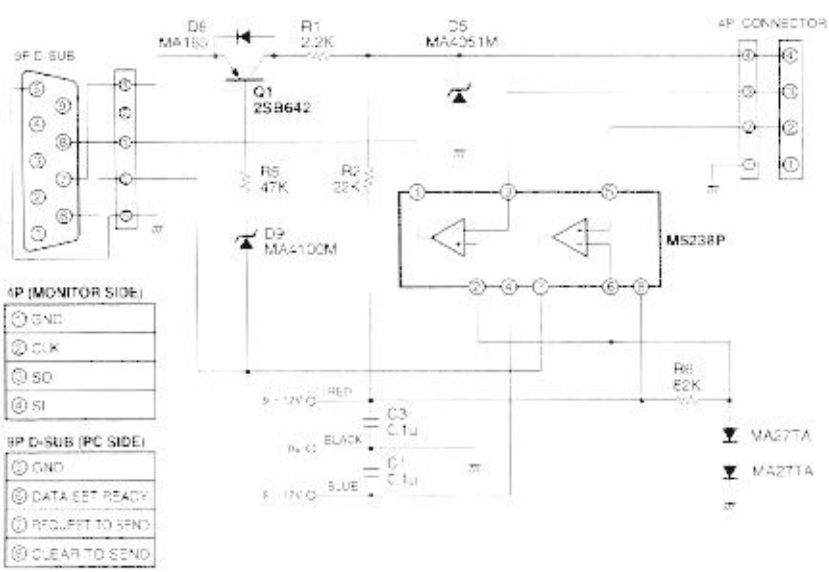
- **Power Supply**
  A DC 9~12 V (+9~12 V/-9~12 V) power supply is required for operating the interface.

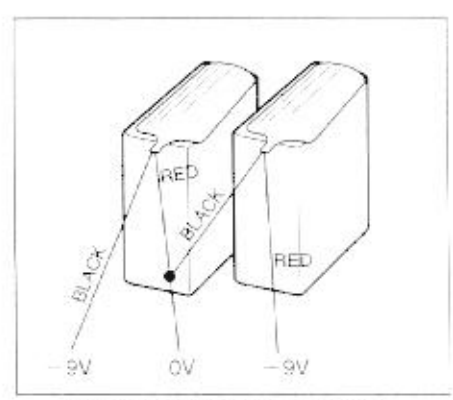
- **Signal Generator**
  It is necessary for you to use a signal generator which operates on fH 86 kHz, fv 160 Hz, and fc 135 MHz bands.

## INTERFACE CONNECTION




## INTERFACE SCHEMATIC DIAGRAM




BATTERY CONNECTION

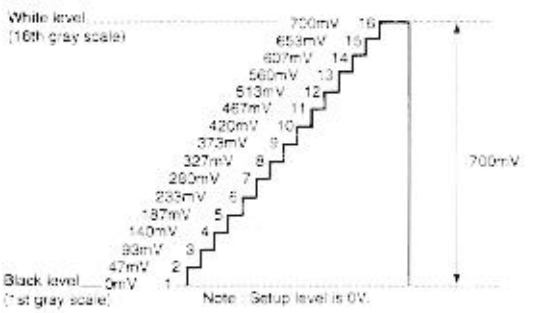
## OTHER TOOLS

- Oscilloscope (dual trace)
- Scope probe – Attenuation: 100:1
  Attenuation: 10:1
- Digital Voltmeter – Range: 0 to 1000 V DC
  Accuracy: 0.1 %
- TV color Analyzer I – that reads luminance and chromaticity X and Y coordinates
- Digital High Voltmeter
- AC power supply – Output voltage : 0 to 300 V
- Degaussing coil
- Convergence meter
- Scale
- Double-faced scale
- Microscope – Scale factor: 50
- White racquer (Paint)

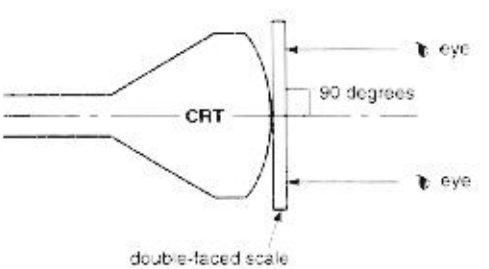
## STANDARD CONDITION OF ADJUSTMENT PROCEDURE

- Signal timing : Standard timing 1024 x 768 (See page 5)
- Display pattern : White, full "H" character
- Signal level : V/H: TTL level video: 700 mV
- Input source : AC 120 V, 60 Hz
- Ambient temperature : Room temperature
- Warm-up time : More than 30 minutes
- Brightness control : Center
- Contrast control : Max.
- Magnetic field : Vertical : 40 μT
  Horizontal: 0 μT
- Signal cable : Attached

Video input signal from PC.




- Use a Helmholtz device to adjust an unit with no horizontal magnetic field and a vertical field of 40 μT. Inspect the unit under the same conditions.
- The ambient illuminance must be 200 lux.
- Use an external degaussing coil any time the DEGAUSS switch does not remove color shading.
- To check the image width, height, linearity and distortion, proceed as below.




Measure level with respect to tube axis.

# ADJUSTMENT SOFTWARE

## 1. Software operating procedure

A) Power on the computer.

B) Connect the Communication cable for monitor adjustment.

C) Insert the adjustment disk into the drive.

D) At the A:> prompt type "VSR", then press [ENTER].

> A function to identify the connected monitor is provided to prevent accidents due to erroneous use of the HV8 chassis program. If this program is used for any monitor other than the HV8, the message reading 'This monitor is not an HV8 chassis. All further activity has been prevented' is displayed and the operation is stopped.

E) Refer to the adjustment procedures.

## 2. Adjustment Program

Main Menu of Adjustment Program

<<HV8 ADJUST PROGRAM MAIN MENU>> (0: exit) <Ver *.*>

| | |
|---|---|
| 1) Load data from FILE | 6) Clear User preset |
| 2) Adjust H. OSC freerun | 7) Save data to FILE |
| 3) Adjust VSR setting | 8) Special ADJUST |
| 4) Adjust OTHER setting | 9) Information Service |
| 5) Adjust Factory preset | 10) Show Version & Error |

Description of Function of Each Menu

1) Load Data from File
This transfers the data file from the disk to the EEPROM on the monitor.

2) Adjust H. OSC Freerun
To guarantee that the full range of horizontal frequencies operate correctly. The reference oscillation frequency should be set.

3) Adjust VSR Setting
To guarantee that the full range of horizontal frequencies operate correctly. The reference voltage and the distortion offset data should be set.

4) Adjust Other Setting
This is used to control the brightness and color.

5) Adjust Factory Preset
Makes adjustments to the factory presets. This data is also referenced when in modes other than the preset mode.

6) Clear User Preset
Clear the data written in the user preset domain. There is no data in the User presets when the product shipped from the factory.

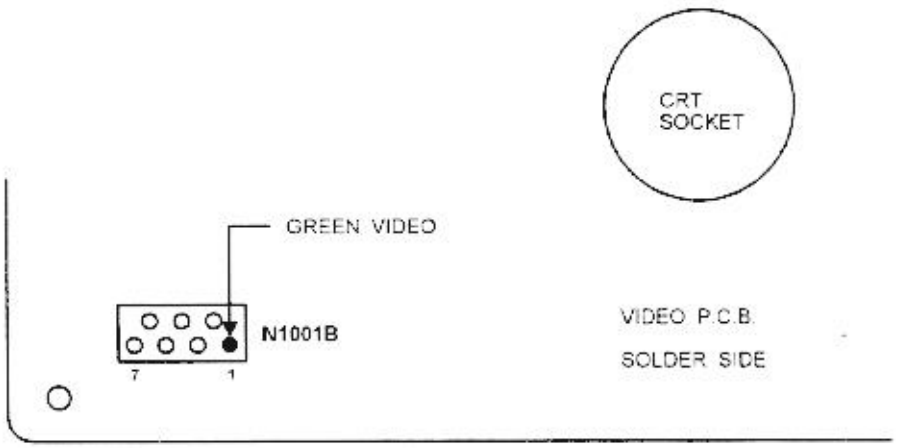
7) Save Data to File
Transfers the data from the EEPROM on the monitor to a data file on a floppy disk or hard drive. The data file can be named anything as long as it is less than 8 characters long.

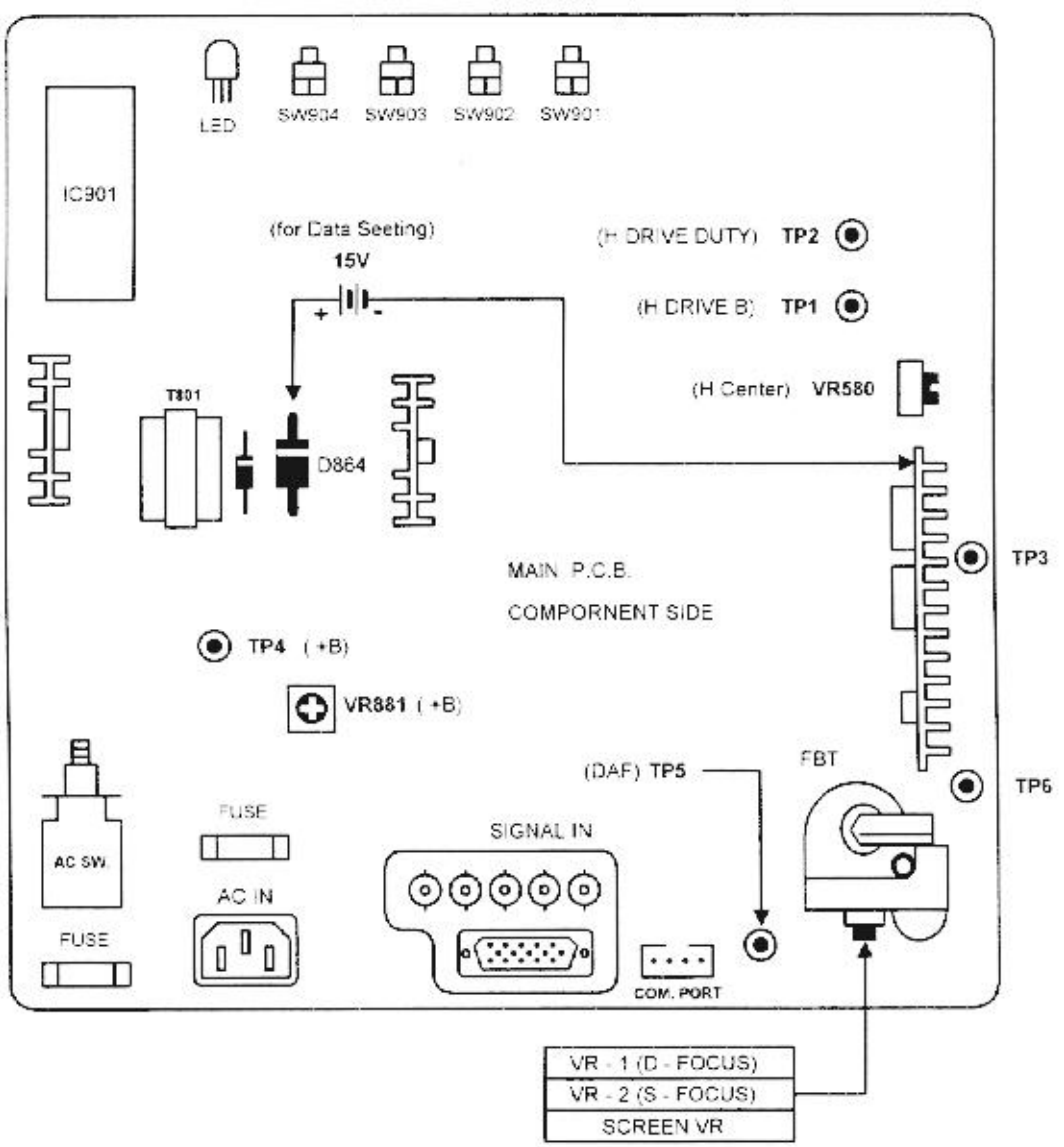
8) Special Asjust
This menu has the following functions
qRelated data is automatically set on the basis of adjustment results to save the time for adjustment.
(Example: Color adjustment applies only to the 9300 K, while 6550 K and user color data are automatically set.)

9) Information Service
Displays the H/V frequencies that is being supplied to the monitor and gives the operational status of the monitor.

10) Show Version and Error
Shows the version of the microprocessor that is in the monitor. Also, if there is an error in the operation of the monitor. The error is displayed on the screen of the PC.

# SERVICE ADJUSTMENT CONTROL LOCATION



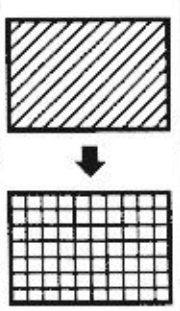
## REQUIRED ADJUSTMENT PROCEDURE AFTER A PARTS IS REPLACED (✓ IS REQUIRED)

| | ADJUSTMENT ITEM | REPLACED PARTS | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MAIN P.C.B. | VIDEO P.C.B. | CRT DY | IC1302 IC1341 IC1307 IC351 Q1052 Q1152 Q1252 | IC901 | IC820 Q826 Q831 PC821 | IC490 | IC501 | IC582 | Q719 Q550 Q855 Q717 | FBT Q680 Q690 | IC301 IC302 Q353 Q354 | | | | | |
| A | DATA SETTING * | ✓ | | | | ✓ | | | | | | | | | | | | |
| B | +B ADJUST | ✓ | | | | ✓ | ✓ | | | | | | | | | | | |
| C | H. FREE RUN | ✓ | | | | ✓ | | | ✓ | | | | | | | | | |
| D | H. DRIVE DUTY | ✓ | | | | ✓ | | | ✓ | | | | | | | | | |
| E | H. DRIVE +B | ✓ | | | | ✓ | | | | ✓ | | | | | | | | |
| F | EHT | ✓ | | ✓ | | ✓ | | | ✓ | | | ✓ | | | | | | |
| G | H. CENTER | ✓ | | ✓ | | ✓ | | | ✓ | | ✓ | ✓ | | | | | | |
| H | V. SIZE / POSI DISTORTION | ✓ | | ✓ | | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | |
| I | H. SIZE / POSI DISTORTION | ✓ | | ✓ | | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | |
| J | PRESET | ✓ | | ✓ | | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | |
| K | DAF | ✓ | | | | ✓ | | | | | | | ✓ | | | | | |
| L | FOCUS | ✓ | | ✓ | | ✓ | | | | | | ✓ | ✓ | | | | | |
| M | CUT-OFF & BRIGHTNESS | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | | ✓ | | | | | | |
| N | DATA SAVING | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | |
| | PURITY & CONVERGENCE | | | ✓ | | | | | | | | | | | | | | |
| | SCREEN CHECK | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

*** DATA SETTING : Do not load standard data except when main PCB and IC901 are replaced.**

# 5 ADJUSTMENT PROCEDURE

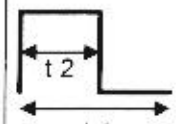
## 1. Description of Adjustment Method

| | Program Menu Item | ♦ Test Meter<br>↓ Test Point<br>□ Pattern | JOB CODE | Input Signal | Operation | Adjusting Value |
|---|---|---|---|---|---|---|
| A | **STANDARD DATA SETTING**<br>1) Load data from FILE | ↓ D864 - GND<br>Refer to service adjustment control location for connect point. | A1<br>A2<br>A3<br>A4<br>AE | | Do not connect the power and signal cable to monitor.<br>Apply 15V to D864 CATHODE and GND<br>( Do not apply 5V to IC901. Because IC833 will supply the 5V and RESET signal to IC901 )<br>Set the cell to the menu at left and press [⏎].<br>A massage<br>**FILE -> EEPROM FILE NAME (q or Q escape) [ ] :** is displayed. So key in the DACDATA.DAT (when using the standard data) and press [⏎]<br>Disconnect 15V cable, then turn on the power switch of the monitor. | |
| | **Do not load standard data except when Main P.C.B. and IC901 are replaced.** | | | | | |
| B | **+B ADJUST** | ♦ Digital voltmeter<br>↓ TP4 ~ GND<br>□ RGB OFF (SYNC ONLY) | B1<br>B2 | HV8-1 | Check that the input signal to the monitor is [fH 29.5kHz] and [fV 48.0Hz].<br>Make the adjustment to the value shown at right by turning the **VR881** on the main PCB. | 82V +0.5 -1.0 |
| C | **H. FREE RUN**<br>2) Adjust H. OSC freerun | □ Crosshatch | C1<br>C2<br>C3<br>C4<br>C5<br>C6<br>C7<br>C8<br>C9<br>C10<br>CE | HV8-1<br><br>HV8-2<br><br>HV8-4<br><br>HV8-6<br> | Set the cell to the menu at left and press [⏎].<br>Set the cell to the adjusting mode INTP [0] and press [⏎].<br>Check that the input signal to the monitor is [fH 29.5kHz] and [fV 48.0Hz] and press [⏎].<br>When the screen image has stabilized, press [⏎] to return to menu of **C2**.<br>Input signal [fH 39.0kHz] and [fV 77.1Hz]<br>Select Adjusting mode INTP [1], and repeat above procedure.<br>Input signal [fH 64.5kHz] and [fV 105.0Hz]<br>Select Adjusting mode INTP [2], and repeat above procedure.<br>Input signal [fH 86.0kHz] and [fV 165.1Hz]<br>Select Adjusting mode INTP [3], and repeat above procedure.<br>Press [E] to return to main menu. |  |

Note 1 : Check to be sure that the program disk name is **GT775** before making necessary adjustment.

Note 2 : Unless otherwise specified, the monitor state is as given at right.

Note 3 : The underlined places indicate the adjustment items on the screen of the PC.

| Program Menu Item | ◆ Test Meter<br>↓ Test Point<br>□ Pattern | JOB CODE | Input Signal | Operation | Adjusting Value |
|---|---|---|---|---|---|
| **H. DRIVE DUTY**<br>3) Adjust VSR setting | ◆ Oscilloscope<br>↓ TP2 ~ GND<br>□ Crosshatch | D1 | | Set the cell to the menu at left and press [↵]. |  |
| | | D2 | | Set the cell to the adjusting mode INTP [0] and press [↵]. | |
| | | D3 | HV8-1 | Check that the input signal to the monitor is [fH 29.5kHz] and [fV 48.0Hz] and press [↵]. | t2 ÷ t1 × 100 = |
| | | D4 | | Set the cell to H. DRIVE DUTY and press [↵]. | |
| | | D5 | | Make the adjustment to the value shown at right by using [←] and [→]. | 52% ±2.5% |
| | Oscilloscope Range<br>HV8-1 10μs/div.<br>HV8-2 5μs/div.<br>HV8-4 5μs/div.<br>HV8-6 2μs/div. | D6 | | Register by pressing [↵] and return to menu of **D2** by pressing [E]. | |
| | | D7 | HV8-2 | Input signal [fH 39.0kHz] and [fV 77.1Hz] | 51% ±2.5% |
| | | D8 | | Select Adjusting mode INTP [1] and repeat above procedure. | |
| | | D9 | HV8-4 | Input signal [fH 64.5kHz] and [fV 105.0Hz] | 47% ±2.5% |
| | | D10 | | Select Adjusting mode INTP [2], and repeat above procedure. | |
| | | D11 | HV8-6 | Input signal [fH 86.0kHz] and [fV 165.1Hz] | 42% ±2.5% |
| | | D12 | | Select Adjusting mode INTP [3], and repeat above procedure. | |
| | | DE | | Press [E] to return to main menu. | |
| **H. DRIVE +B**<br>3) Adjust VSR setting | ◆ Digital voltmeter<br>↓ TP1 ~ GND<br>□ Crosshatch | E1 | | Set the cell to the menu at left and press [↵]. | |
| | | E2 | | Set the cell to the adjusting mode INTP [0] and press [↵]. | |
| | | E3 | HV8-1 | Check that the input signal to the monitor is [fH 29.5kHz] and [fV 48.0Hz] and press [↵]. | |
| | | E4 | | Set the cell to H. DRIVE +B and press [↵]. | |
| | | E5 | | Make the adjustment to the value shown at right by using [←] and [→]. | 21.0V ±0.3V |
| | | E6 | | Register by press [↵] and return to menu of **E2** by press [E]. | |
| | | E7 | HV8-2 | Input signal [fH 39.0kHz] and [fV 77.1Hz] | 20.5V ±0.3V |
| | | E8 | | Select Adjusting mode INTP [1] and repeat above procedure. | |
| | | E9 | HV8-4 | Input signal [fH 64.5kHz] and [fV 105.0Hz] | 18.0V ±0.3V |
| | | E10 | | Select Adjusting mode INTP [2], and repeat above procedure. | |
| | | E11 | HV8-6 | Input signal [fH 86.0kHz] and [fV 165.1Hz] | 16.0V ±0.3V |
| | | E12 | | Select Adjusting mode INTP [3], and repeat above procedure. | |
| | | EE | | Press [E] to return to main menu. | |

| rogram Menu Item | ↓ Test Point<br>□ Pattern | JOB CODE | Input Signal | Operation | Adjusting Value |
|---|---|---|---|---|---|
| **EHT ADJUST**<br>4) Adjust OTHER setting | ♦ Digital voltmeter<br>♦ High Voltage Probe<br>↓ Anode Cap – GND<br>□ RGB off (Sync only) | F1<br>F2<br><br>F3<br>F4<br>F5<br><br>F6<br>F7<br><br>FE | <br><br><br><br>HV8-6<br><br><br><br><br> | Turn the power switch of the monitor OFF.<br>Connect high voltage probe to Anode Cap and GND.<br>Turn the power switch of the monitor ON.<br>Set the cell to the menu at left and press [↵].<br>Check that the input signal to the monitor is [fH 86.0kHz] and [fV 165.1Hz].<br>Set the cell to EHT and press [↵].<br>Make the adjustment to the value shown at right by using [←] and [→].<br>Register by press [↵] after adjustment and return to main menu by press [E]. | <br><br><br><br><br><br><br>26.4kV ±0.3kV |
| **H. CENTER** | □ RGB off (Sync only) | G1<br>G2<br><br>G3 | <br>HV8-6<br><br> | Set the Brightness to MAX on the OSD.<br>Check that the input signal to the monitor is [fH 86.0kHz] and [fV 165.1Hz].<br>Make the adjustment as shown at right by turning the **VR580** on the main PCB. | A A=B B<br>Back raster<br>Set the raster to the center with respect to the bezel. |
| **V. SIZE / POSI and DISTORTION**<br>5) Adjust OTHER setting | □ Crosshatch | H1<br>H2<br>H3<br><br><br><br><br><br><br><br>HE | <br>Mode-1<br><br><br><br><br><br><br><br><br> | Set the cell to the menu at left and press [↵].<br>Check that the input signal to the monitor is [fH 60.0kHz] and [fV 75.0Hz] and press [↵].<br>Set the cell to following items, press [↵] and make the adjustment to the value shown at right by using [←] and [→].<br>① * H. SIZE ⑥ V. PCC BARANCE<br>② * H. POSITION ⑦ PARALLELOGRAM<br>③ V. SIZE ⑧ TRAPEZOID<br>④ V. POSITION ⑨ V. LIN (C)<br>⑤ * V. PCC<br>H. SIZE, H. POSI and V. PCC is dose not register to interpolation data<br>After adjustment, return to the main menu by using [E]. | <br><br>H : 300mm ±5<br>V : 225mm ±5<br><br>H/V Posi : Center<br><br>V. PCC : Best point |
| **H. SIZE / POSI, V. PCC and V.LIN**<br>3) Adjust VSR Setting | □ Crosshatch | I1<br>I2<br><br>I3<br><br>I4 | <br><br><br>HV8-1<br><br><br> | Set the cell to the menu at left and press [↵].<br>Set the cell to the adjusting mode INTP [3] and press [↵].<br>Check that the input signal to the monitor is [fH 29.5kHz] and [fV 48.0Hz] and press [↵].<br>Set the cell to following items, press [↵] and make the adjustment to the value shown at right by using [←] and [→].<br>① H. SIZE ④ V. PCC CORNER<br>② H. POSI ⑤ V. LIN (S)<br>③ V. PCC<br>**- To be continued -** | <br><br>H : 300mm ±5<br>V : 225mm ±5<br><br>H/V Posi : Center<br><br>V. PCC :<br>V. LIN :<br>Best point |

| Program Menu Item | • Test Meter<br>↓ Test Point<br>□ Pattern | JOB CODE | Input Signal | Operation | Adjusting Value |
|---|---|---|---|---|---|
| **H. SIZE / POSI, V. PCC and V.LIN**<br>3) Adjust VSR Setting | □ Crosshatch | I5<br><br>I6<br>I7<br><br>I8<br>I9<br><br>I10<br>I11<br><br>IE | <br><br>HV8-2<br><br><br>HV8-4<br><br><br>HV8-6<br><br> | After adjusting the above, return to menu of **I2** by using [E].<br>Input signal [fH 39.0kHz] and [fV 77.1Hz]<br>Select Adjusting mode INTP [1], and repeat above (**I4~I5**) procedure.<br>Input signal [fH 64.5kHz] and [fV 105.0Hz]<br>Select Adjusting mode INTP [2], and repeat above procedure.<br>Input signal [fH 86.0kHz] and [fV 165.1Hz]<br>Select Adjusting mode INTP [3], and repeat above procedure.<br>After adjustment, return to the main menu by press [E] | H : 300mm ±5<br>V : 225mm ±5<br><br>H/V Posi : Center<br><br>V. PCC :<br>V. LIN :<br>Best point |
| **PRESET ADJUST**<br>4) Adjust Factory preset | □ Crosshatch | J1<br>J2<br><br>J3<br><br><br><br><br><br><br>J4<br><br><br>JE | <br>Mode-1<br><br><br><br><br><br><br><br><br>M2~M8<br><br><br> | Set the cell to the menu at left and press [↵].<br>Check that the input signal to the monitor is [fH 60.0kHz] and [fV 75.0Hz] and press [↵].<br>Set the cell to following items, press [↵] and make the adjustment to the value shown at right by using [←] and [→].<br>① H. SIZE ⑤ V. PCC<br>② H. POSI ⑥ PARALLEL<br>③ V. SIZE ⑦ TRAPEZOID<br>④ V. POSI<br>Make above adjustment when out of adjusting value by changing input signal to Mode-2~8 and check screen image.<br>After adjustment, return to the main menu by using [E] and [N]. | Mode-1<br>H : 300mm ±5<br>V : 225mm ±5<br>Mode-2~7<br>H : 300mm ±7<br>V : 225mm ±7<br>Mode-8<br>H : 286mm ±7<br>V : 229mm ±7<br><br>H/V Posi : Center<br><br>V. PCC :<br>Best point |
| **DAF ADJUST**<br>8) Special ADJUST<br><br>Oscilloscope Range<br>2us/div | □ White flat field<br>• Oscilloscope<br>↓ TP5~GND<br>100:1 probe<br>↓ N1001B(2)<br>~ GND<br>10:1 probe | K1<br>K2<br>K3<br><br>K4<br>KE | <br><br>HV8-4<br><br><br> | Set the cell to the menu at left and press [↵].<br>Select the 3. ADJUST H.DAF GAIN<br>Check that the input signal to the monitor is [fH 64.5KHz] and [fV 105.0Hz]<br>Adjust as shown at right by using [←] and [→]<br>Press [E] to return to menu of **K2** and return to main menu by press [E] [↵]. | <br><br><br><br>332V ±10V<br>Refer to **Fig.K** for adjustment |

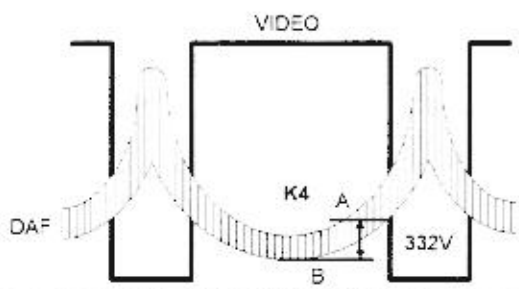
**Fig.K**

**Adjusting Value of K4**

K4 : Set to voltage A-B

A : Crossing VIDEO and DAF

B : Bottom of DAF



| Program Menu Item | ↓ Test Point<br>□ Pattern | JOB CODE | Input Signal | Operation | Adjusting Value |
|---|---|---|---|---|---|
| **FOCUS** | □ Character | L1 | Mode-1 | Check that the input signal to the monitor is [fH 60.0kHz] and [fV 75.0Hz]. | |
| | | L2 | | Make the corner sections of the screen optimum by turning FOCUS VR 1 on the FBT. | |
| | | L3 | | Make the center section optimum by turning FOCUS VR 2 on the FBT. | |
| | | L4 | | Repeat **L2** and **L3** to make it optimum. | |
| **CRT CUT-OFF** | ◆ TV Color Analyzer II | M1 | | Set the Contrast to MAX. Brightness to Center and Color is 9300k by using the OSD. | |
| 4) Adjust OTHER setting | □ RGB Off (Sync only) | M2 | Mode-1 | Check that the input signal to the monitor is [fH 60.0kHz], [fV 75.0Hz] and turn off the RGB signal. | |
| | | M3 | | Set the cell to the menu at left and press [↵] | |
| | | M4 | | Make the adjustment R,G and B Low Light by | |
| | | – | | using [←] , [→] and Screen VR to CRT cut-off. | |
| | | M14 | | **Please refer to flow chart for this adjustment on page 29.** | |
| **BRIGHTNESS & COLOR ADJUST** | □ White window (5cm×5cm at the center) | M15 | Mode-1 | Change to the pattern at left. | |
| | | M16 | | Move the cell to the following items and make the adjustment to the value shown at right by using [←] and [→].<br>R. SUB CONT 9300K<br>G. SUB CONT 9300K<br>B. SUB CONT 9300K | Y=130 cd/m$^2$<br>x=0.283 ±0.020<br>y=0.298 ±0.020 |
| | | M17 | | Set CONTRAST to MIN by using the OSD. | |
| | | M18 | | Move the cell to the following items and make the adjustment to the value shown at right by using [←] and [→].<br>R. LOW LIGHT **Adjust two colors only**<br>G. LOW LIGHT **out of these (RGB) three as**<br>B. LOW LIGHT **shown in M12 on page 29.** | x=0.283 ±0.020<br>y=0.298 ±0.020 |
| | | M19 | | Set CONTRAST to MAX by using the OSD. | |
| | | M20 | | Check the value shown at right, then If out of range, to repeat **M16~M20**. | Y=130 cd/m$^2$<br>x=0.283 ±0.020<br>y=0.298 ±0.020 |
| **ABL** | □ White flat field (full window) | M21 | Mode-1 | Set CONTRAST to MAX by using the OSD. | |
| | | M22 | | Change to the pattern at left. | |
| | | M23 | | Move the cell to ABL 9300K and make the adjustment to the value shown at right by using [←] and [→] | Y=110 cd/m$^2$ |
| | | M24 | | Press [E] to return to main menu. | |
| **DATA SETTING**<br>8) Special ADJUST | | M25 | | Set the cell to the menu at left and press [↵] | |
| | | M26 | | Select the 2: ADJUST COLOR from the menu. This messages will appear :<br>**Calculate COLOR 6550K data automatically . OK ? >** press[Y]and [↵] | |
| | | M27 | | **Calculate USER COLOR data automatically . OK ? >** press[Y]and [↵] | |
| | | M28 | | | |

**- To be continued -**

| rogram Menu Item | ♦ Test Meter<br>↓ Test Point<br>□ Pattern | JOB CODE | Input Signal | Operation | Adjusting Value |
|---|---|---|---|---|---|
| | | M29 | | **Calculate ABL data automatically . OK ? >**, press[Y]and [↵]<br>**finished . ( Hit return key )** | |
| | | M30 | | Press [↵], to menu of **M26**. | |
| | | M31 | | Press[E] [↵], to return to the main menu. | |
| **1.0V ADJUST**<br>8) Special ADJUST | ♦ TV Color Analyzer II | M32<br>M33 | | Set the cell to the menu at left and press [↵].<br>Select the 1: ADJUST VIDEO 1.0Vpp from the menu. | |
| | □ White window (5cm×5cm at center)<br>1.0V p-p video | M34<br>M35<br><br>ME | Mode-1 | Change to the pattern and signal level at left.<br>Make the adjustment to the value shown at right by using [←] and [→].<br>Press [↵] to return to menu of **M34**, then press [E] [↵] to return to the main menu. | Y=130 cd/m$^2$ |
| **FINAL TUNE**<br>8) Special ADJUST | | N1<br>N2 | | Set the cell to the menu at left and press [↵].<br>Select the 9:FINAL TUNE from the menu.<br>(Step 1):Data tuning.<br>This messages will appear :<br>**<loading EEPROM data> ...end**<br>**<tuning EEPROM data> ... end**<br>**<saving data to EEPROM> ... end**<br>**<RECALL data - PRESET data> wait a moment**<br>(Step 2):Erase user preset data.<br>**Erase All ' user preset data OK ? >** | |
| | | N3 | | Press[Y]or[N]and [↵], go to **N4**.<br>(Step 3):Calculate color data.<br>**Calculate COLOR 6550K data automatically . OK ? >**, press[Y]and [↵]. | |
| | | N4 | | **Calculate USER COLOR data automatically . OK ? >**, press[Y]and [↵]. | |
| | | N5 | | **Calculate ABL data automatically . OK ? >**, press[Y]and [↵]<br>**finished . ( Hit return key )** | |
| | | N6 | | Press [↵], to menu of **N2**. | |
| | | N7 | | Press[E] [↵], to return to the main menu. | |
| | | NE | | | |
| **DATA SAVING**<br>7) Save data to file | | O1<br>O2 | | Set the cell to the menu at left and press [↵].<br>Key in the file name after [ ] :<br><br>Use serial number as a file name.<br>( EXAMPLE JK711001234 = "JK711001.234" ) | |

# CRT CUT- OFF ADJUSTMENT

**WARNING**

**Do not turn the screen VR after this adjustment.**

Conditions

Signal : Turn off the R,G,B (sync signal only)
Adjust Menu 4) Adjust OTHER setting

Using by Color Analyzer for M11 and M12 adjustment

**M4** Set screen VR fully counterclockwise (Min).

**M5** Set BRIGHTNESS to center point by using the OSD

**M6** Set data value to "20" for R, G, B LOW LIGHT

**M7** Turn screen VR until the raster appears with any one of three (R,G,B) colors

## If Red appears in M7

**M8** Set Value to "FF" for < R. LOW LIGHT >

**M9** Turn screen VR until the raster appears with any one of two (G or B) colors

### If Green appears in M9

**M10** Set Value to "FF" for < G. LOW LIGHT >

**M11** Adjust Screen VR to "0.50" cd/m² for Blue raster

**M12** Adjust < R. LOW LIGHT > < G. LOW LIGHT > to [ x=0.283 y=0.298 ]

### If Blue appears in M9

**M10** Set Value to "FF" for < B. LOW LIGHT >

**M11** Adjust Screen VR to "3.51" cd/m² for Green raster

**M12** Adjust < R. LOW LIGHT > < B. LOW LIGHT > to [ x=0.283 y=0.298 ]

## If Green appears in M7

**M8** Set Value to "FF" for < G. LOW LIGHT >

**M9** Turn screen VR until the raster appears with any one of two (R or B) colors

### If Red appears in M9

**M10** Set Value to "FF" for < R. LOW LIGHT >

**M11** Adjust Screen VR to "0.50" cd/m² for Blue raster

**M12** Adjust < R. LOW LIGHT > < G. LOW LIGHT > to [ x=0.283 y=0.298 ]

### If Blue appears in M9

**M10** Set Value to "FF" for < B. LOW LIGHT >

**M11** Adjust Screen VR to "1.00" cd/m² for Red raster

**M12** Adjust < G. LOW LIGHT > < B. LOW LIGHT > to [ x=0.283 y=0.298 ]

## If Blue appears in M7

**M8** Set Value to "FF" for < B. LOW LIGHT >

**M9** Turn screen VR until the raster appears with any one of two (R or G) colors.

### If Red appears in M9

**M10** Set Value to "FF" for < R. LOW LIGHT >

**M11** Adjust Screen VR to "3.51" cd/m² for Green raster

**M12** Adjust < R. LOW LIGHT > < B. LOW LIGHT > to [ x=0.283 y=0.298 ]

### If Green appears in M9

**M10** Set Value to "FF" fo < G. LOW LIGHT >

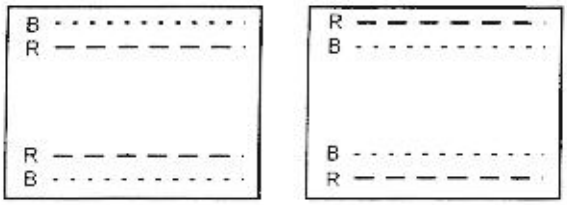
**M11** Adjust Screen VR to "1.00" cd/m² for Red raster

**M12** Adjust < G. LOW LIGHT > < B. LOW LIGHT > to [ x=0.283 y=0.298

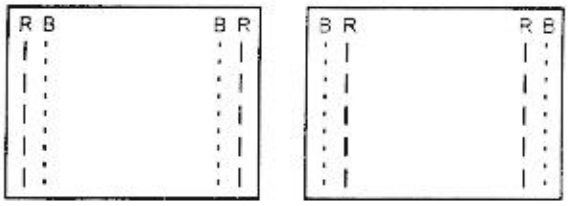
**M13** Test Pattern : 16 gradation grayscale Adjust screen VR so the 2nd level of gray appears slightly

## 2. Adjustment Location for Purity and Convergence

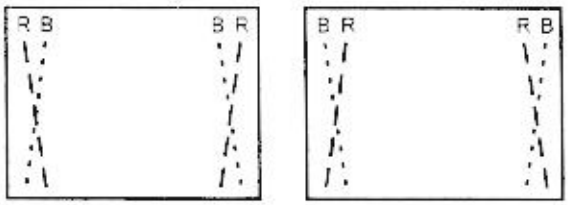
① Differential VR - YV

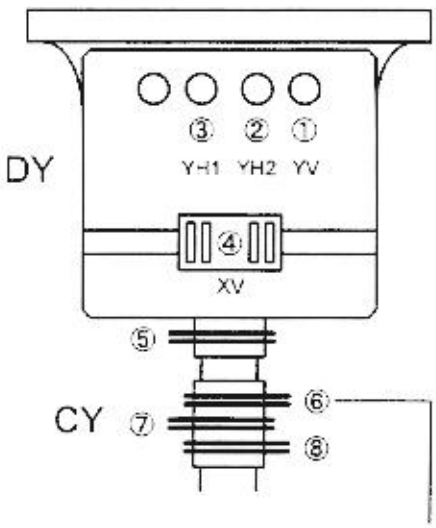



② Differential VR - YH2

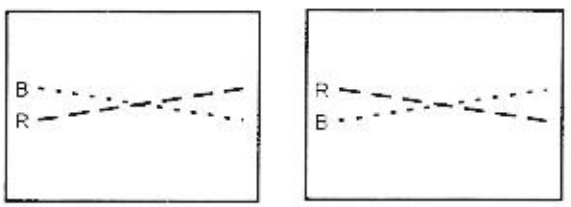



③ Differential VR - YH1

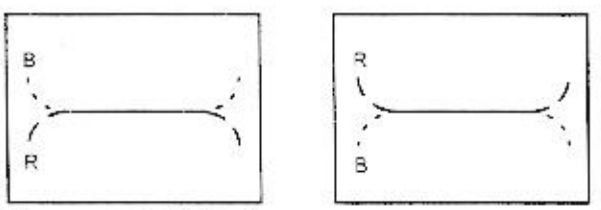



④ Differential Coil - XV



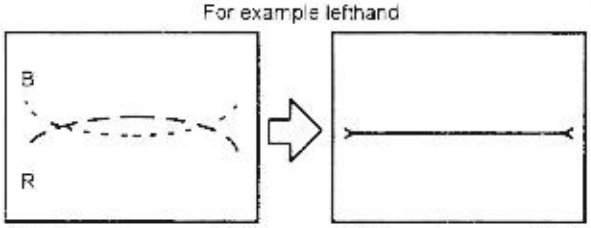

⑤ Four-pole magnet B




Beams are twisted lefthand

Beams are twisted righthand

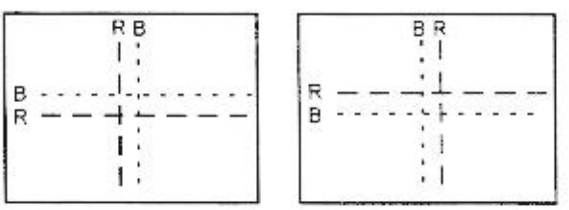
For example lefthand




With four-pole magnet B ⑤

With four-pole magnet A ⑦

⑦ Four-pole magnet A




⑧ Six-pole magnet